INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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August 21, 2002

Mr. Fred Bartman
Remedial Project Manager
U. S. Environmental Protection Agency
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Bartman:

Re: Five-Year Review Report
Continental Steel Superfund Site
Kokomo, Howard County

The Indiana Department of Environmental Management (IDEM) has completed the Five-Year Review for the Continental Steel Superfund site. The report is enclosed with this letter. The Five-Year Review Report incorporates preliminary comments that were received from the U.S. Environmental Protection Agency (EPA) Region V. If you have any comments or questions regarding this report, please feel free to call me at (317) 234-0357.

Sincerely,

Pat Likins, Project Manager
Remedial Services Branch
Office of Land Quality

PEL:tr
cc: Rex Osborn, OLQ
Rosita Clark, U.S. EPA Region V

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Five-Year Review Report

First Five-Year Review Report
for
Continental Steel Superfund Site
City of Kokomo
Howard County, Indiana

July 2002

PREPARED BY:

Indiana Department of Environmental Management
Indianapolis, Indiana

Approved by:	**Date:**
Lori F. Kaplan	8-14-02
Lori F. Kaplan, Commissioner **Indiana Department of Environmental Management**	
for **William E. Muno, Superfund Division Director** **U.S. Environmental Protection Agency, Region V**	9/4/02

FIVE YEAR REVIEW REPORT

Table of Contents

ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
ATSDR	Agency for Toxic Substances and Disease Registry
BERA	Baseline Environmental Risk Assessment
BHHRA	Baseline Human Health Risk Assessment
CAMU	Corrective Action Management Unit (landfill)
CERCLA	Comprehensive Environmental Response, Compensation and Liabilities Act
CFR	Code of Federal Regulations
COPC	Contaminant of Potential Concern
CSSS	Continental Steel Superfund Site
CUs	Contract Units
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
HQ	Hazard Quotient
IDEM	Indiana Department of Environmental Management
IDOH	Indiana Department of Health
IRA	Interim Remedial Action
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NCRA	Non-time Critical Removal Action
OUs	Operable Units
PAHs	Poly-Aromatic Hydrocarbons
PCBs	Poly-Chlorinated biphenyls
PP	Proposed Plan
SPM	State Project Manager
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
SF	Slope Factor
TCE	Trichlorethelene
TCRA	Time Critical Removal Action
TEC-1	Threshold Effect Concentration
UST	Underground Storage Tank
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The Continental Steel Superfund Site (CSSS) in Kokomo, Indiana, was initially addressed by an interim Resource Conservation and Recovery Act (RCRA) closure action performed by the Indiana Department of Environmental Management (IDEM) from 1989 to 1990. Several U.S. Environmental Protection Agency (EPA)-lead Time Critical Removal Actions (TCRAs) were performed from 1990 to 1993, and a State-lead Non-time Critical Removal Action (NCRA) was performed from 1998 to 1999. A State-lead Interim Remedial Action (IRA) was performed at CSSS from 1999 to 2000.

The interim RCRA closure action involved neutralization of waste sulfuric acid stored in open lagoons in the Acid Lagoon area, and placement of neutralized sludge back into the lagoons. The EPA-Lead TCRAs removed drums and contaminated soil from the Markland Avenue Quarry area. This action included removal of approximately 1100 drums from the quarry pond. EPA removed buried drums from several areas along the north bank of Wildcat Creek in the Acid Lagoon area; and removed drums, contaminated soil, above-ground tank contents, underground storage tanks and other waste materials from the Main Plant area. The IRA addressed imminent risk at Operable Unit 5A, the Main Plant area, and included the decontamination and demolition of 127 buildings and other structures, disposal of drummed wastes and disposal of other hazardous and non-hazardous waste materials.

The final Remedial Action (RA) is currently in the Remedial Design (RD) phase. It is tentatively scheduled (pending the availability of funds) to begin in 2003, and will include:

- Excavation of contaminated soils and sediment;
- Containment of contaminated soils and sediments in a Corrective Action Management Unit (CAMU) on site;
- Capping;
- Institutional controls;
- Treatment of shallow and intermediate groundwater; and
- Monitored natural attenuation of contaminated groundwater in the deep aquifer.

The assessment of this five-year review found that a protectiveness determination of the remedy, if carried out in accordance with the requirements of the Record of Decision (ROD), can not be made at this time until further information is obtained. One Explanation of Significant Differences (ESD) was issued to explain the increase in the cost of the IRA from the cost that was estimated in the Focused Feasibility Study. The NCRA and the IRA are functioning as designed. Groundwater cleanup goals in the shallow and intermediate aquifers are expected to be achieved through treatment, which is expected to require 30 years. Monitored natural attenuation and institutional controls comprise the RA for the deep aquifer. A Technical Impracticability Waiver was granted for the site-wide groundwater in the deep aquifer. Groundwater modeling performed during the Remedial Investigation (RI) predicts that it will take 100 years to reach cleanup goals in the deep aquifer.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name (from WasteLAN): Continental Steel Superfund Site		
EPA ID (from WasteLAN):		
Region: V	**State:** IN	**City/County:** Kokomo/Howard
SITE STATUS		
NPL Status: x Final _ Deleted _ Other (specify)		
Remediation Status (choose all that apply): _ Under Construction _ Operating _ Complete		
Multiple OUs? x YES _ NO	Construction completion date __/__/__	
Has site been put into reuse? _ YES x NO		
REVIEW STATUS		
Lead agency: __ EPA x State __ Tribe __ Other Federal Agency		
Author name: Pat Likins		
Author Title: Project Manager	**Author affiliation:** Indiana Department of Environmental Management	
Review period:** 05/04/1998 to 04/__/2002		
Date of site inspection: 04/15/2002		
Type of review: _x_ Post-SARA __Pre-SARA __NPL-Removal only __ Non-NPL Remedial Action Site _x_NPL State/Tribe-lead __ Regional Discretion		
Review number: x 1 (first) __2 (second) __3 (third) __ Other (specify		
Triggering action: _x_ Actual RA on-site Construction at OU#_5_ __ Actual RA Start at OU# __ __ Construction Completion __ Previous Five-Year Review Report __ Other (specify)		
Triggering action date (from WasteLAN): 05/04/1998		
Due Date (five years after triggering action date): 05/04/2003		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Continental Steel Superfund Site
Kokomo, Indiana
First Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identifies recommendations to address them.

IDEM is preparing this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA) Subsection 121 and the National Contingency Plan (NCP). CERCLA Subsection 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP; 40 CFR 300.430(f)(4)(ii) that states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

IDEM conducted the five-year review of the remedy implemented at CSSS in Kokomo, Indiana. This review was conducted by the State Project Manager (SPM) for the entire site from March 2002 through July 2002. This report documents the results of the review.

This is the first five-year review for CSSS. The triggering action for this statutory review is the initiation of the NCRA on May 4, 1998. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1 - Chronology of Site Events

March 1989	Based on preliminary investigations, Acid Lagoon area placed on the NPL. Main Plant and the Markland Avenue Quarry added shortly thereafter.
August 1989	EPA Technical Action Team inspected site for possible removal actions.
October 1989	IDEM contractor began removing and disposing of pickle liquor from the Acid Lagoon area. Lime was added to the pickle liquor to achieve a uniform pH. Treated liquor was then discharged to the Kokomo treatment plant.
February 1990	EPA began removing surface drums from Markland Avenue Quarry. A berm was constructed to inhibit off-site migration of contaminated water.
March 1990	EPA and IDEM inspected Main Plant for possible removal actions.
April 1990	EPA conducted an underwater investigation of Markland Avenue Quarry pond. Roughly 1,000 drums were found. Sampling was conducted.
May 1990	EPA removed drums, tank contents, capacitors and transformers from Main Plant. Removed over 200 chemicals from metallurgical lab. Drum disposal continued.
June 1990	IDEM contractor completed treatment and discharge of pickle liquor in Acid Lagoon area.
November 1990	IDEM conducted preliminary assessment of Dixon Road Quarry. The assessment indicated potential contamination.
June 1991	EPA began removal of over 1,100 submerged drums from Markland Avenue Quarry Pond.
May 1992	Some EPA TCRAs completed. Community interviews conducted for Community Relations Plan.
December 1992-February 1993	Approximately 1350 buried drums were removed from the bank of Wildcat Creek at the Acid Lagoon area. Also, 1250 cubic yards of contaminated soil was removed.
August 1993	Main Plant sampled for PCBs, PAHs, asbestos, and lead. Approximately 90 cubic yards of lead-contaminated dust consolidated and contained on site. Hundreds of cubic yards of lead-contaminated debris separated, stockpiled and covered for future disposal. Lead removed from the buildings. Asbestos presence confirmed. EPA sampled sewers and drained acid from tank T-18. Acid later disposed off-site.
October 1993	About 121 cubic yards of PCB contaminated soil excavated from western portion of Main Plant area, disposed off-site. Drums collected throughout site during the 1993 removal were stored for later disposal off-site.
1993	Phase I of Remedial Investigation completed. (Acid Lagoon area, Wildcat and Kokomo Creeks, site-wide groundwater).
Fall 1994	EPA removed contents and cleaned above ground storage tanks. Tanks T-14 and T-15 emptied but not cleaned.

December 1994	IDEM reported to EPA that one residential well was contaminated with Trichlorethelene (TCE).
March 1995	EPA installed an air stripper on the residential well.
1995	Phase II of Remedial Investigation completed (Markland Avenue Quarry, Main Plant, Slag Processing area and data gaps for Phase I with regard to site-wide groundwater, the Acid Lagoon area and the creeks.
June 1996	Indiana State Department of Health performed environmental radiation surveys in Slag Processing area, Acid Lagoon area, and the former laboratory area in the Main Plant. No evidence of gross radiological contamination.
September 1996	**Interim Record of Decision signed by IDEM and EPA to decontaminate and demolish buildings in Main Plant area.**
July 1997	IDEM proposed removal of lead contaminated soils from residential yards east of the Main Plant.
April 1997	**Action Memorandum documented decision to remove contaminated soils in residential area. Final Proposed Plan presented to the National Remedy Review Board for approval.**
February 1998 to March 1998	First public comment period for the Final Record of Decision for all six Operable Units.
April 1998 to May 1998	Second public comment period for final Record of Decision for all six Operable Units.
May 5, 1998	IDEM began removal of lead-contaminated residential soil.
September 1998	**Final Record of Decision signed for all six Operable Units. Marked completion of investigation and described cleanup actions.**
December 1998	Removal of lead contaminated residential soils completed.
April 1999	IDEM began decontamination and demolition of Main Plant buildings with asbestos survey.
December 28, 2000	IDEM completed decontamination and demolition of Main Plant buildings.
August 2001	Field investigative activities for Remedial Design completed.
July 2001	Basis of Design plans for Slag Processing area (proposed firing range scenario) completed. Implementation held pending local land use approval.
November 14, 2001	ESD presented at a Public Meeting.
December 14, 2001	Public comment period for ESD closes.
March 28, 2002	ESD signed by IDEM and EPA.
April 2002	Pre-final Basis of Design plans for Acid Lagoon area (CAMU construction) submitted.
May 20-21, 2002	Community interviews held for Five-Year Review.

June 11, 2002	IDEM commenced weed control and fence maintenance measures in Main Plant area.
June 13, 2002	Public Availability Sessions held for Five-Year Review.
June 24, 2002	EPA completed repairs to residential soil pile in Slag Processing area.
July 2002	Preliminary Basis of Design plans for Main Plant area submitted.

III. Background

Physical Characteristics

The CSSS is located on West Markland Avenue in Kokomo, Indiana. The total site covers approximately 183 acres and includes an abandoned steel manufacturing facility (Main Plant). The Main Plant consists of about 94 acres and is bordered by Markland Avenue on the north, Park Avenue on the west, Leeds Street on the east and Kokomo Creek on the south. It included abandoned buildings with floor areas ranging from 10,000 square feet to 400,000 square feet. Many buildings had basements, some of which were flooded with ground water. Underground sewers and utility lines are also located on-site. The site was abandoned in 1986, so the buildings were deteriorated and the site was heavily overgrown with weeds and shrubs. There are no viable Potentially Responsible Parties, so the remedy is being funded by the Superfund Trust Fund through EPA with a 10% cost share being paid from the Indiana Hazardous Substances Response Trust Fund by the State of Indiana.

Land and Resource Use

Continental Steel was built in 1914. The plant produced nails, wire, and wire fence from scrap metal. Operations included reheating, casting, rolling, drawing, pickling, annealing, hot-dip galvanizing, tinning, and oil tempering. The steel manufacturing operations at the plant included the use, handling, treatment, storage, and disposal of hazardous materials. CSSS operated from approximately 1914 to 1986, before the company entered into bankruptcy. The area surrounding the facility is mixed residential, commercial, and industrial use and is zoned for general use, except for the Main Plant and Acid Lagoon areas, which have industrial-use-only deed covenants.

History of Contamination

The Markland Avenue Quarry was a former limestone quarry purchased in 1947 and used until the early 1980s by Continental Steel for the disposal of waste materials from steel processing operations. The quarry, approximately 23 acres in size, is bordered to the north by Harrison Street, to the south by West Markland Avenue, to the east by Courtland Avenue, and to the west by Brandon Street. Apparently, near-empty drums were taken to the quarry and the remaining contents dumped onto the ground. A large portion of the quarry has been backfilled with slag, refractory brick, pig iron, baghouse dust, and, possibly, drums. Previous investigations identified more than 400 drums, several tanks and other waste materials scattered across the property. Drums contained mostly oils, solvents, and refuse, and were disposed in the quarry pond. Drums were removed from the quarry pond in 1990 by EPA. The quarry is currently fenced. The unbackfilled portion of the quarry pond is mostly filled with water. Vegetation has grown in areas where backfill material was placed.

The Main Plant is bordered by West Markland Avenue to the north, Leeds Street to the east, and Park Avenue to the west, and extends west of Park Avenue to Wildcat Creek . The Main Plant included many abandoned buildings with basements (some of which were flooded with water), underground sewers, and utility lines. Previous investigations identified more than 700 oil and solvent-filled drums scattered throughout the Main Plant, 55 aboveground and underground storage tanks (ASTs/USTs) and 33 vats. Tanks and vats contained primarily oil and some chlorinated solvents and acids. Twenty-four electrical transformers, 200 capacitors, electric arc furnace dust (baghouse dust), and exposed asbestos were also found at the Main Plant.

The Acid Lagoon area is located approximately 0.3 miles west of the Main Plant along the south side of West Markland Avenue (see Figure 2-1). The area covers approximately 56 acres and is composed of 10 lagoons that formerly received spent pickling and finishing liquors from the Main Plant. The area is bordered on the south and west by Wildcat Creek and to the east by the City of Kokomo wastewater treatment plant. The Acid Lagoon area is fenced along the entire perimeter, however, there are gaps in the fence. The lagoons now retain surface water runoff from rainfall.

Slag material generated from Continental Steel operations was processed and disposed in an area along West Markland Avenue approximately 0.2 miles west of the Acid Lagoon area. The area, known as the Slag Processing area, consists of approximately nine acres and is bounded to the north by West Markland Avenue, to the south and west by Wildcat Creek, and to the east by the Acid Lagoon area. Slag processing apparently involved the reclamation of metals from the slag. An undetermined amount of slag was placed in this area. The slag consisted primarily of calcium and iron oxides with lesser amounts of aluminum, chromium, lead, manganese, magnesium, and zinc oxides. Slag materials may also have been contaminated with oils and solvents. A portion of the Slag Processing area was formerly known as the Chaffin Quarry. The Chaffin Quarry may also have been used to dispose waste materials (i.e., drums) from the Main Plant. Currently the Slag Processing area is unfenced and contains exposed slag material. A 50-foot high mound of slag encompasses the west/northwest section of the area and a depression occurs in the southwest corner. The remainder of the area is graded. Lead-contaminated soil from the Residential Soil Removal Action is stockpiled in this area. To prevent any airborne release of contaminants, IDEM initially covered the stockpile with visqueen and it has since been regraded and hydroseeded by EPA. Slag piles are not covered, but present no threat of airborne release of contaminants. Direct contact risk is to future residents and construction workers only.

Groundwater beneath CSSS appears to have received contaminants from the Main Plant, the Markland Avenue Quarry, the Acid Lagoon area, other areas related to the site and possibly from adjacent industrial facilities. Groundwater quality varies considerably, however, and contamination exists outside the source areas identified above.

Kokomo and Wildcat Creeks run along the borders of the Main Plant and the Acid Lagoon area. The Kokomo area is drained by these two creeks which are tributaries of the Wabash River. Kokomo Creek is generally 15 to 20 feet wide and less than 2 feet deep, and Wildcat Creek is generally 30 to 50 feet wide and approximately 2.5 to 5 feet deep. The creeks have received water from the plant's wastewater recycling and filtration system, neutralized pickle liquor from the Acid Lagoon area, discharge from site outfalls, and stormwater runoff from the site.

Initial Response

Immediate Removal Actions. Continental Steel was placed on the National Priorities List (Superfund list) in 1989. EPA began removal actions at the Main Plant and Markland Avenue Quarry in February 1990. Drums at the quarry and Main Plant were collected, staged, analyzed, and disposed. Capacitors and transformers were removed. Some tank liquids were analyzed and disposed, and seven underground storage tanks were removed. Various chemicals were also removed from a laboratory facility at the Main Plant. Surface soil contaminated with polychlorinated biphenyls (PCBs) was removed from the former drum staging area at the quarry. Surface drums were over-packed, sampled, and disposed. A berm was also constructed. In May 1990, EPA staged and sampled many drums at the Main Plant. Tank content samples were collected and the liquids removed and disposed. Capacitor and transformer oils were analyzed, drained and disposed. In August 1993, the Main Plant area was sampled for PCBs, polycyclic aromatic hydrocarbons (PAHs), asbestos and lead. Approximately 90 cubic yards of lead-contaminated dust were consolidated, containerized, and stored on-site. Lead-contaminated debris was separated, stockpiled and covered for future disposal. Lead was removed from several of the buildings. Asbestos presence was confirmed in the buildings. EPA sampled sewers and drained the acid from tank T-18. The acid was disposed off-site. In October 1993, one cubic yard of PCB-contaminated soil was excavated from the western portion of the Main Plant and disposed off-site. Various drums collected throughout the site from previous removal efforts were disposed off-site. In the fall of 1994, EPA removed contents and cleaned several above ground storage tanks, and several others were emptied but not cleaned.

Interim Remedial Action - Decontamination and Demolition of Main Plant Buildings. IDEM performed an investigation of the Main Plant area in 1995. The investigation identified concerns that the buildings presented a potential risk to nearby residents and trespassers. As a result, an Interim Risk Assessment/Feasibility Study for the Main Plant Buildings was performed in 1996 and an Interim Proposed Plan was developed. The Interim Proposed Plan recommended that the buildings be decontaminated and demolished. Four alternatives were presented for consideration. They were:

- Alternative 1 - No Action;
- Alternative 2 - Immediate Decontamination and Demolition of the Buildings;
- Alternative 3 - Immediate Decontamination of the Buildings; and
- Alternative 4 - Securing the Buildings.

The proposed plan was presented to the public in March 1996, and signed in September 1996. Alternative 2 – Immediate Decontamination and Demolition of the Main Plant Buildings was the chosen alternative. Removal of the building structures would likely be required prior to remediation of contaminated soil that was detected during the investigation. The presence and poor physical condition of the structures would make the remediation of the soil more difficult. It would be impracticable to underpin or partially demolish a structure to gain access to soils beneath. As buildings continued to deteriorate, the potential for the contaminants inside to be released and migrate off-site would increase. Therefore, a greater potential for additional risks to human health and the environment would be created. The major components of the selected interim remedy included:

- Gross removal of lead dust from building interiors with disposal of dust as hazardous waste in a permitted facility;
- Management and proper disposal of rinse water collected from decontamination;
- Abatement of exposed friable asbestos-containing material and asbestos-containing insulation by removal and disposal at a permitted facility;
- Sampling to confirm decontamination;

- Removal of PCB-contaminated wood block floors and disposal as hazardous waste;
- Demolition of all building superstructures, tanks, and equipment to grade, leaving floor slabs;
- Salvaging of structural steel as scrap unless it could be decontaminated and reused;
- Disposal of all debris and demolition rubble as hazardous, special or non-hazardous waste as determined by waste characterization;
- Use of water for dust control during demolition. Dust control water runoff would be contained and managed properly;
- Pumping out flooded basements, removal of equipment and residue;
- Filling or covering of pits and basements;
- Finishing of unpaved areas with crushed stone; and
- Securing of the site after the interim remedy was completed.

The work began with an asbestos survey in April 1999 and was completed on December 28, 2000.

<u>Non-time Critical Removal Action - Residential Soil Removal Action.</u> To address the threat to human health posed by lead-contaminated residential soils, a Non-time Critical Removal Action was performed. The action included excavation of contaminated surface soil and placement in an off-site landfill. The total volume of material that was excavated from the off-site residential area was approximately 14,700 cubic yards.

The components of this alternative were as follows:

- Removal of small shrubbery and yard equipment from the residential area of concern;
- Removal of lead contaminated surface soil to a depth of approximately one foot;
- On-site x-ray fluorescence testing of excavated surface soil samples for lead to determine limits of excavation;
- Laboratory confirmation sampling of approximately 20 percent of the surface soil samples (approximately 200);
- Backfill excavation to grade with clean fill;
- Restoration of the site with sod and replacement of small shrubbery and yard equipment;
- Transportation of contaminated soil to an off-site landfill;
- Dust suppression measures including wetting down and covering exposed soils during transportation off-site as appropriate; and
- Preventative measures (i.e., temporary fencing, caution tape and flagging) during construction activities to inhibit visitor (children) intrusion onto the removal area.

The work began on May 5, 1998, and concluded on February 26, 1999.

Basis for Taking Action
IDEM and EPA have determined that the CSSS poses potential long-term risks to human health and the environment by the presence of various chemical constituents above the acceptable cancer risk range of $1x10^{-4}$ to $1x10^{-6}$, and above the non-cancer hazard risk quotient of one (1), that were established in the NCP, 40 Code of Federal Regulations (CFR)

300.430(e)(2)(i)(A)(2). This determination was documented in the ROD for CSSS, signed by IDEM and EPA on September 30, 1998.

IV. Remedial Actions

Remedy Selection

The preferred RAs for the six Operable Units (OUs) of CSSS were presented to the public in a Proposed Plan (PP) in March 1997, and the RA selection was documented in the ROD signed by IDEM and EPA September 30, 1998.

Remedy Implementation

No final remedial actions have been completed at this time.

System Operation/Operation and Maintenance (O&M)

O&M will begin after the components of the RA have been constructed. There are no O&M activities required by the interim RCRA closure, immediate removal actions, or the IRA.

V. Progress Since the last Five-Year Review

This is the first five-year review for CSSS.

VI. Five-Year Review Process

Administrative Components

Members of the community were notified of the initiation of the five-year review by postcards mailed on June 6, 2002; by ads placed in the Kokomo Tribune on June 9, 2002; and by ads placed in the Kokomo Perspective on June 6, 2002. The CSSS Five-Year Review team was led by Pat Likins of IDEM, State Project Manager (SPM) for CSSS, and included members from IDEM Science Services staff with expertise in hydrology, biology, and risk assessment. Risk Assessment review was performed with the assistance of a contractor. Mr. Matt Mankowski and Mr. Fred Bartman of EPA assisted in the review as representatives for the support agency.

On May 30, 2002, the review team established the review schedule whose components included:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Report Development and Review.

The schedule extended through September 30, 2002.

Community Involvement

Activities to involve the community in the five-year review were initiated with a public availability session. A notice was sent to two local newspapers that a five-year review was to be conducted and that there would be a public availability session on June 13, 2002. Postcards stating the same were sent to community members, the Howard County Health Department, the Office of the Mayor of Kokomo, the County Commissioner's Office, Congressman Buyer, Senator Lugar, Senator Coates, and State Representative Herrell, and the residents of properties adjacent to the CSSS. The postcards invited the recipients to submit any comments to IDEM.

During the public availability sessions and the interviews, members of the community expressed concerns that creek sediments posed direct contact risk to children and requested that warning signs be posted. Community members also expressed that on-site containment and construction of the CAMU are not protective in the long term. Other community members expressed approval of these actions. An elected official stated that the waste should be shipped to an existing facility and asked about the difference in cost for off-site disposal. Other issues addressed in the community interviews were communication and future land use. A full report of issues and information compiled from the interviews is presented in Attachment 5.

On ***(date to be included following EPA review of report),*** a notice was sent to the same local newspapers that announced that the Five-Year Review report for the CSSS was complete, and that the results of the review and the report were available to the public at the Kokomo/Howard County Public Library and IDEM office.

Document Review
This five-year review consisted of a review of relevant documents including: the 1996 Interim Record of Decision; the 1998 Final Record of Decision; the 2001Explanation of Significant Differences - Operable Unit 5-A (Decontamination and Demolition of Main Plant Buildings); the Baseline Human Health Risk Assessment (BHHRA); the NCRA Remediation Completion Report, and pre-design investigation data. Applicable groundwater cleanup standards, as listed in the 1998 Record of Decision, were reviewed (see Attachment 4).

Data Review
Groundwater
The planned RA provides for groundwater monitoring at regular intervals. Sampling performed from May through August of 2001 for the RD indicated horizontal and vertical extents of contamination in shallow, intermediate and deep groundwater consistent with those identified during the RI/FS. The extent of the northward-tending portion of contaminated groundwater near the Markland Quarry area that extends into a residential area has not been identified. Although residences in the area are connected to the municipal water supply, the RI/FS did not identify if, or the extent to which, homes with basements are affected by contaminated groundwater. Only newly installed wells were sampled in 2001, therefore we do no have data to directly compare to the results of samples collected from wells during the RI/FS.

Surface Water and Sediment
Sampling performed from May through August of 2001 for the RD indicated that there has been little change to the condition of surface water and sediment in Markland Quarry and in Kokomo and Wildcat Creeks. The level of contamination in the sediments of Kokomo and Wildcat Creeks remains elevated. The "Evaluation of Sediments in Kokomo and Wildcat Creeks" did determine that the background levels for PCBs in Kokomo and Wildcat Creeks were lower than previously determined. Since the cleanup goals were based on background, the evaluation recommended

new cleanup goals consistent with current background information. The report also provided more concise data regarding the sediment volume. Using the new data and applying a risk-based approach, the estimated volume of sediment to be excavated from the creeks has been greatly reduced.

Recent sampling verified that the current pH of Markland Quarry surface water is 11.5. Sampling also confirmed that sediment at the bottom of the quarry, targeted for excavation, will require treatment to reduce the volume of Volatile Organic Compound (VOC) contaminants prior to disposal.

<u>Soil and Sludge</u>
Sampling performed from May through August 2001 for the RD provided more specific information regarding the vertical and horizontal extent of soil and sludge contamination in the Acid Lagoon area and the Main Plant area. Soil borings in the Main Plant indicated that the areas requiring common soil cover due to the presence of metals, PCBs, and PAHs, are considerably larger than previously estimated. The area along the south perimeter of the Main Plant that is contaminated with PCBs and lead was also determined to be larger than previously estimated. The contaminated area along the south perimeter that is within the flood plain is to be excavated in accordance with the ROD.

Site Inspection
Inspections at the site were conducted on April 15, 16 and 17, 2002, by the SPM. The purpose of the inspections was to assess the protectiveness of the remedy, including the presence of fencing to restrict access. Institutional controls were evaluated by reviewing the Title Search completed by EPA on March 15, 2002.

The fence was found to be ineffective at the Acid Lagoon area. The fence had been destroyed in a large area along the east perimeter (between the Acid Lagoon area and the Kokomo Municipal Wastewater Treatment facility). Heavy debris was causing the fence to lean along the south perimeter of the property at the northeast corner of the Acid Lagoon area. (The adjoining property is part of the Kokomo wastewater treatment plant). Several cuts were noted in the fence at the Markland Avenue Quarry.

Institutional controls that are in place include deed restrictions at the Acid Lagoon area and the Main Plant area limiting the use of those areas to industrial/commercial use.

Interviews
Interviews were conducted with various parties connected to the site. Interview forms were also provided during the public availability sessions on June 13, 2002. A total of twenty interviews were completed. The full report of results is presented in Attachment 5.

VII. Technical Assessment

Question A
Is the remedy functioning as intended by the decision documents?
Answer A

The review of documents, Applicable or Relevant and Appropriate Requirements (ARARs), risk assumptions, and the results of the site inspection indicate that further information is needed in order to determine whether the remedy, when implemented, would function as intended by the ROD. This review recommends the adoption of the new Maximum Contaminant Level (MCL) that has been established for Arsenic. (See Answer B below.) There were no opportunities for system optimization observed during this review, however, value engineering evaluations have identified some efficiencies that could be incorporated into the RD. Institutional controls in the form of deed restrictions limit the use of two areas of the site, the Main Plant area and the Acid Lagoon area, to industrial/commercial use. No activities were observed that would have violated the institutional controls, however evidence of trespassing was observed in all areas of the site. There is no physical barrier that restricts access to Kokomo and Wildcat Creeks. Fences around the Acid Lagoon area and the Markland Avenue Quarry area are not intact. The entrance to the Slag Processing area restricts automobile or truck access, but there is no fence to restrict access by foot or other means. There is evidence of recent trespassing in the Acid Lagoon area and the Main Plant area.

Question B

Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Answer B

The exposure assumptions used to develop the Baseline Human Health Risk Assessment (BHHRA) are listed in the following table.

Table 2 - Baseline Risk Assessment - Populations That May Be Exposed

Receptors	Current	Future
Onsite residents		**MQ, SP, GW/MQ, GW/SP**
Offsite Residents	**MP(**), MQ(***), GW(*)**	**MP(**), MQ, GW**
Onsite Commercial/Industrial Workers	MQ	**MP**, MQ, **AL**, SP, GW
Offsite Commercial/Industrial Workers	GW	GW
Trespassers	**MP**, MQ, **AL**, SP	**MP**, MQ, **AL**, SP
Recreational Visitors	**KWC**	**KWC**
Onsite Construction Workers		**MP**, MQ, **SP**, GW

MP= Main Plant area, MQ = Markland Quarry, AL = Acid Lagoon area, SP = Slag Processing area, GW = Groundwater, KWC - Kokomo and Wildcat Creeks

*Exposure routes that exceeded cancer or non-cancer criteria are indicated by **bold** print.*

(*) No current off-site residents within the affected area are believed to be using groundwater.

(**) This risk was addressed by the NTRA performed from 1998 to 1999.

(***) BRA recommended further investigation. See Sections VIII and IX.

These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels.

The BHHRA was reviewed to determine whether changes in site conditions, screening criteria, or toxicity values that have occurred since the risk assessment was completed would increase the risks previously estimated or introduce additional risks not previously considered, and whether the established remediation goals require modification as a result. The full report is included in this report as Attachment 4. Although there were increased risks associated with toxicity changes for a number of Contaminants of Potential Concern (COPCs) and additional COPCs identified using new screening criteria, they were not significant in most cases. Only risks associated with groundwater use were significantly impacted.

Risks associated with potential exposure to TCE in groundwater increased substantially due to the revisions of the Slope Factors (SFs) and the oral Reference Dose (RfD). Nevertheless, the remediation goal for TCE, which was set at the drinking water MCL of 0.005 mg/L, still appears to be adequately protective. In shallow groundwater, risks associated with exposures to iron and arsenic, which were not evaluated in the original assessment, are estimated to be above acceptable levels. The new MCL for arsenic of 0.010 mg/L should be adopted as remediation goal for groundwater, consistent with the goals already established. The remediation goal for iron in groundwater could be set at its secondary MCL of 0.3 mg/L (as was done for manganese) or a higher risk-based value up to 5 mg/L.

Table 3 Changes in Chemical Specific Standards

CONTAMINANT OF POTENTIAL CONCERN	PREVIOUS MCL	CURRENT MCL
Arsenic	0.050	0.010
Iron (secondary MCL)		0.3

Based on a review of updated ecological screening benchmarks, new COPCs were identified for each exposure area. In addition, chemicals with a log K_{ow} greater than 3.5 were included as COPCs due to their potential to bio-accumulate. Chemical-specific exposure factors and toxicity values also were updated during the review process.

Remediation goals for the site were based mainly on the results of the BHHRA and background concentrations. Since Hazard Quotients (HQs) for ecological receptors substantially greater than 1 were estimated in the Baseline Environmental Risk Assessment (BERA) but not addressed in the ROD, it did not appear useful to recalculate all exposure estimates and HQs for the American robin, Indiana bat, and great blue heron. Ecological screening benchmarks for surface soil indicated that final remediation goals for the Markland Avenue Quarry, Acid Lagoon area, and Slag Processing area were below the benchmarks except for lead in the Acid Lagoon area (remediation goal of 1,096 mg/kg vs screening level of 500 mg/kg). All final remediation goals for the Main Plant exceeded ecological screening benchmarks. Comparison of final remediation goals for sediment to ecological screening benchmarks indicated that remediation goals are not protective of ecological receptors.

Table 4 - Chemical-Specific Factors for COPCs

Table B-5
Chemical-Specific Factors for COPCs
Continental Steel Superfund Site
Kokomo, IN

Chemical	STPs[(a)]	BAFinv[(b)]	STI/F[(c)]
Acenaphthene	0.12	**30.3**	**607**
Acenaphthylene	0.17	**30.3**	NA
Anthracene	0.11	**30.3**	**2,600**
Benzo(a)anthracene	0.019	**30.3**	**5,100**
Benzo(a)pyrene	0.011	**30.3**	**9,950**
Benzo(b)fluoranthene	0.011	**30.3**	**9,950**
Benzo(b,k)fluoranthene	NA	**30.3**	**9,950**
Benzo(k)fluoranthene	0.0043	**30.3**	**9,950**
Benzo(g,h,I)perylene	0.0056	**30.3**	NA
Bis(2-ethylhexyl)phthalate	0.055	**30.3**	**360**
Chrysene	0.019	**30.3**	**6,030**
Dibenzo(a,h)anthracene	0.0043	**30.3**	**12,800**
Fluoranthene	0.055	**30.3**	**15,700**
Fluorene	0.11	**30.3**	**1,200**
Indeno(1,2,3-cd)pyrene	0.0056	**30.3**	**13,100**
Pentachlorophenol	0.014	**30.3**	**397**
Phenanthrene	0.082	**30.3**	**3,300**
Pyrene	0.055	**30.3**	**11,900**
Acetone	**52**	**30.3**	0.4
1,1-Dichloroethene	**3.4**	**30.3**	**24.1**
Methylene chloride	**6.7**	**30.3**	**5.3**
2-Methylnaphthalene	0.21	**30.3**	NA
Trichloroethene	**1.5**	**30.3**	**41.6**
Toluene	1.0	**30.3**	**62.7**
Vinyl chloride	1.0	**30.3**	**4.37**
Xylenes	1.0	**30.3**	**160**
Aroclors	0.013 *(0.02)*	**30.3 (3.0)**	**9.016 (5.058)**
Antimony	0.005	0.523	**40**
Arsenic	0.0371	0.523	0.329
Barium	0.1	1.0	NA
Beryllium	0.01	1.0	**42**
Cadmium	0.517 *(0.55)*	**40.7 (4.6)**	**2.822**
Chromium	0.04	**3.16**	0.179
Cobalt	0.054	1.0	NA
Copper	0.123	**1.53**	**2.424**
Lead	0.0377	**1.52**	0.276
Manganese	0.68	0.29	NA
Mercury	1.0	**20.6**	**1.422 (1)**
Nickel	0.0342	**4.73**	0.857
Thallium	0.004	1.0	**1,400**
Zinc	0.358	**12.9**	**3.092**

Notes:

Numbers in parenthesis were values used in CSSS ERA.

Values greater than 1 will lead to increased risk estimates and are printed in **bold** type.

(a) = STP factors from Bechtel Jacobs Company (1998a) and RAIS (2002).

(b) = BAFinv factors for inorganic COPCs from Sample et al. 1998 and Braunschweiler 1996;
BAFinv factors for organic COPC values were calculated using Menzie et al. (1992) methods.
Assumes lipid content of earthworm is 2%, f_{oc} is 0.01.

(c) = STI/F factors for inorganic COPCs and PCBs from Bechtel Jacobs Company (1998b); all other STI/F from EPA (1998).

NA = Not available.

Table 5 - Chemicals Detected in Surface Soil (Non-Residential) - Main Plant, Acid Lagoon area

Table A-3
Chemicals Detected in Surface Soil (Non-Residential) - Main Plant, Acid Lagoon area

Chemicals Detected	New and/or Lower Screening Value?	COPC added?	Comment
Inorganics			
Aluminum	no	No	
Antimony	no	No	
Arsenic	no	No	
Barium	no	No	
Beryllium	no	No	
Cadmium	no	No	
Calcium	no	No	
Chromium (as Cr VI)	YES	No	Already a COPC, Acid Lagoon area
Cobalt	YES	No	Max < current screening value
Copper	no	No	
Cyanide	no	No	
Iron	no	No	
Lead	no	No	
Magnesium	no	No	
Manganese	no	No	
Mercury	no	No	
Nickel	no	No	
Potassium	no	No	
Selenium	no	No	
Silver	no	No	
Sodium	no	No	
Thallium	YES	No	Max < current screening value
Vanadium	no	No	
Zinc	no	No	
Pesticides/PCBs			
4,4'-DDD	no	No	
4,4'-DDE	no	No	
4,4'-DDT	no	No	
Aldrin	no	No	
alpha-BHC	no	No	
alpha-Chlordane	no	No	
delta-BHC	no	No	
Dieldrin	no	No	
Endosulfan I	no	No	
Endosulfan II	no	No	
Endosulfan Sulfate	no	No	
Endrin	no	No	
Endrin aldehyde	no	No	
Endrin ketone	no	No	

gamma-BHC	no	No	
gamma-Chlordane	no	No	
Heptachlor	no	No	
Heptachlor epoxide	no	No	
Methoxychlor	no	No	
Aroclor 1242	YES	No	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1248	YES	No	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1254	YES	YES	Acid Lagoon area, Max > current screening value
Aroclor 1260	YES	No	Already a COPC, Main Plant
Semivolatiles			
1,2,4-Trichlorobenzene	no	No	
Phenol	no	No	
Pentachlorophenol	no	No	
Carbazole	no	No	
Bis(2-ethylhexyl)phthalate	no	No	
Di-n-butylphthalate	no	No	
Di-n-octylphthalate	no	No	
Dibenzofuran	no	No	
2-Methylnaphthalene	YES	No	Max < current screening value
Acenaphthene	no	No	
Acenaphthylene	no	No	
Anthracene	no	No	
Benzo[a]anthracene	no	No	
Benzo[a]pyrene	no	No	
Benzo[b]fluoranthene	no	No	
Benzo[b&k]fluoranthene	no	No	
Benzo[g,h,i]perylene	no	No	
Benzo[k]fluoranthene	no	No	
Chrysene	no	No	
Dibenz[a,h]anthracene	no	No	
Fluoranthene	no	No	
Fluorene	no	No	
Indeno[1,2,3-cd]pyrene	no	No	
Naphthalene	YES	No	Max < current screening value
Phenanthrene	no	No	
Pyrene	no	No	
Volatiles			
1,1,2-Trichloroethane	no	No	
1,1-Dichloroethane	no	No	
1,1-Dichloroethene	no	No	
1,2-Dichloroethane	no	No	
1,2-Dichloroethene (total)	no	No	
2-Butanone	no	No	
2- Hexanone	YES	No	Max < current screening value
4-Methyl-2-pentanone	no	No	
Acetone	no	No	
Benzene	YES	No	Max < current screening value
Carbon disulfide	no	No	

Chlorobenzene	YES	No	Max < current screening value
Chloroethane	YES	No	Max < current screening value
Chloroform	no	No	
cis-1,3-Dichloropropene	no	No	
Ethylbenzene	no	No	
m,p-Xylenes	no	No	
Methylene chloride	no	No	
o-Xylene	no	No	
Styrene	no	No	
Tetrachloroethene	no	No	
Toluene	no	No	
Xylenes (total)	no	No	
Trichloroethene	YES	YES	Main Plant, Acid Lagoon area, Max > current screening value
Vinyl chloride	no	No	

Screening value = 0.1 x RBC for Residential Soil from EPA Region III (EPA 2002).

Question C
Has any other information come to light that could call into question the protectiveness of the remedy?

Answer C
The Indiana Department of Health (IDOH), in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), has compiled a list of residential wells that should be evaluated to determined if they have been impacted since the completion of the RI. See Sections VIII and IX of this review. Community interviews identified concerns regarding commercial and residential properties near the Markland Avenue Quarry that may be affected by contaminated groundwater.

Further investigation of offsite residential soil was recommended in the area near the Markland Quarry that has not been performed. This is further explained in Section VIII (Issues) and Section IX (Recommendations). Cleanup levels for PCBs in sediments in Kokomo and Wildcat Creeks have been re-evaluated based on updated information regarding background. The resultant cleanup goals for PCBs have been reduced from 5.0 ppm to an average for each reach of less than 1.0 ppm. This is further explained in Section VIII (Issues) and Section IX (Recommendations). Exposure assumptions and cleanup levels for other areas may change based on the outcome of the "Reuse Analysis of the Continental Steel Superfund Site." This is further explained in Sections VIII and IX of this review.

Updated citations for many Indiana ARARs are provided in Attachment 3.

Technical Assessment Summary
A protectiveness determination of the remedy at CSSS cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions:

- Performing further soil sampling in residential area near Markland Quarry;

- Performing vapor sampling and/or water sampling in residential and commercial basements near the Markland Quarry;
- Performing additional residential well sampling as indicated by the results of 2001 monitoring well sampling results;
- Evaluation of the results of the BHHRA review with regard to arsenic, trichloroethene (TCE), Arocholor 1254, and iron; and
- Evaluation of remedial actions relative to the completed "Re-use Analysis of the Continental Steel Superfund Site."

It is expected that these actions will take approximately one year to complete, at which time a protectiveness determination will be made.

VIII. Issues:

Table 6 - Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. A recent Health Consultation performed by the IDOH contains a recommendation to collect current data from several residential wells, to ensure that there are no residential wells contaminated by the Continental Steel Superfund site.	Y	Y
2. The City of Kokomo received a grant from EPA to perform a "Reuse Analysis of the Continental Steel Superfund Site." This analysis, which included community participation as a major component, may result in a change in the community's desired future land use for certain areas of the CSSS.	N	Y
3. Remediation goals for Kokomo and Wildcat Creeks were based upon background levels. A re-evaluation of existing background levels completed in 2002 determined that current background levels are significantly lower.	Y	Y
4. Data indicates contamination from CSSS contributed to levels of PCBs in fish, and presents a direct contact risk to recreational users. A level five (5) fish consumption advisory is in place for Kokomo and Wildcat Creeks, designating all fish from this stream unsafe for human consumption in any amount. Fish Consumption Advisory signs were posted. No physical barrier prevents access to the creeks. Kokomo Creek runs through Highland Park. Children and adults have been observed fishing in Kokomo Creek.	Y	Y
5. For the purposes of the RI, CSSS was divided into six geographical OUs. To divide work into manageable units to accommodate incremental funding, the project was re-organized into units of similar tasks scheduled in order of priority. A new Remedial Design/Remedial Action (RD/RA) Implementation Strategy re-organized the project into five (5) Contract Units (CUs).	N	N
6. The chemical-specific cleanup goals were clearly defined in the BHHRA, however, they were not identified in the ROD. Updated information on background levels in Kokomo and Wildcat Creeks, collected during the pre-design investigation, indicates that the cleanup goal for PCBs should be reduced.	N	Y

Review of the BHHRA indicated the need for additional COPCs and cleanup goals for groundwater.		
7. Fences around the Acid Lagoon area and the Markland Avenue Quarry area are not intact. There is evidence of recent trespassing in both areas.	Y	Y
8. The BHHRA recommended further investigation of offsite residential soils in the Markland Quarry area due to the detection of dibenzo(a,h)anthracene in one offsite soil sample at a level that, if the sample was representative of off-site exposure, may exceed EPAs acceptable risk range. Insufficient data was available to make a determination. Further investigation has not been performed.	Y	Y

IX. Recommendations and Follow-up Actions:

Table 7 - Recommendations and Follow-Up Actions

Issue	Recommendations/Follow-up Actions	Party Respons-ible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
1. Residential wells	Evaluation of groundwater data collected during the pre-design investigation, and sampling of Residential Wells.	IDEM/ EPA	IDEM/ EPA	12/30/02	Y	Y
2. Evaluation of re-use, community participation in remedial design (RD).	IDEM and EPA are coordinating with Kokomo and their contractor, Strand Associates, Inc., to maximize incorporation of re-use plans into the RD. If a desired reuse requires a feasible change in designated land use for an area, IDEM will prepare an Explanation of Significant Differences (ESD).	IDEM/ EPA	IDEM/ EPA	6/30/03	N	Y
3. Creek Sediments, background levels	Sediment data was collected during the pre-design investigation, and the RA for Kokomo and Wildcat Creek sediments was re-evaluated. Updated background levels in Kokomo and Wildcat Creeks indicate that the cleanup goal for PCBs should be reduced from five (5) parts per million (ppm) to one (1) ppm. The proposed cleanup goal will be presented in PP for a ROD Amendment.	IDEM/ EPA	IDEM/ EPA	12/30/02	N	Y
4. Creek sediments, exposure risks	Excavation will eliminate the risk of direct contact with creek sediment. However, levels of PCBs in fish are not	IDEM/ EPA	IDEM/ EPA	6/30/03	Y	Y

	expected to decrease enough to render fish edible for several years. Potential threats to human health through fish consumption is temporarily addressed by Fish Consumption Advisory signs. Further public education is advised. IDEM is funding and performing posting of signs in contaminated areas to discourage direct contact.					
5. Revised Project Implementation Strategy	A PP for a ROD Amendment will be presented to the public for comment. This will incorporate the new RD/RA Implementation Strategy, all chemical-specific cleanup goals, and the new proposed cleanup goals for PCBs in Kokomo and Wildcat Creeks.	IDEM/ EPA	IDEM/ EPA	12/30/02	N	Y
6. ROD Amendment to update COPCs	A PP for a ROD Amendment will be presented to the public for comment. This will incorporate the new RD/RA Implementation Strategy, all chemical-specific cleanup goals, and the new proposed cleanup goals for PCBs in Kokomo and Wildcat Creeks.	IDEM	IDEM	12/30/02	N	Y
7. Fence Repairs	Fence repairs will be included in the RA. IDEM is funding and performing ongoing fence maintenance in the Main Plant area.	IDEM/ EPA	IDEM/ EPA	10/30/02	Y	Y
8. Markland Quarry area soil and ground water	Further sampling of residential soil and indoor air and/or water sampling in nearby basements should be performed in the Markland Quarry area.	IDEM/ EPA	IDEM/ EPA	12/30/02	Y	Y

X. Protectiveness Statement(s):

A protectiveness determination of the remedy at CSSS cannot be made at this time until further information is obtained. The interim RCRA closure, RA, NTCR and the IRA are functioning as designed. Immediate threats to human health were addressed through these actions. The potential threat to human health through consumption of fish from Kokomo and Wildcat Creeks is being temporarily addressed by placement of Fish Consumption Advisory signs along the affected areas of the creeks.

Long-term Protectiveness:

A protectiveness determination of the remedy at CSSS cannot be made at this time until further information is obtained. Groundwater cleanup goals in the shallow and intermediate aquifers are expected to be achieved through treatment, which is expected to require 30 years. Monitored natural attenuation and institutional controls comprise the remedial action for the deep aquifer. A Technical Impracticability Waiver was granted for the site-wide groundwater in the deep aquifer. Groundwater modeling performed during the RI predicts that it will take 100 years to reach cleanup goals in the deep aquifer.

Other Comments:

XI. Next Review

The next five-year review should be performed no later than five years from the date that this review is approved by IDEM and EPA. The review should be completed by September 30, 2007.

Attachments

Attachment 1	Site Map
Attachment 2	List of Documents Reviewed
Attachment 3	Table Documenting Changes in Standards and Updated Citations for Indiana ARARs)
Attachment 4	Final Report, Baseline Risk Assessment Review
Attachment 5	Interview Report
Attachment 6	Photos Documenting Site Conditions

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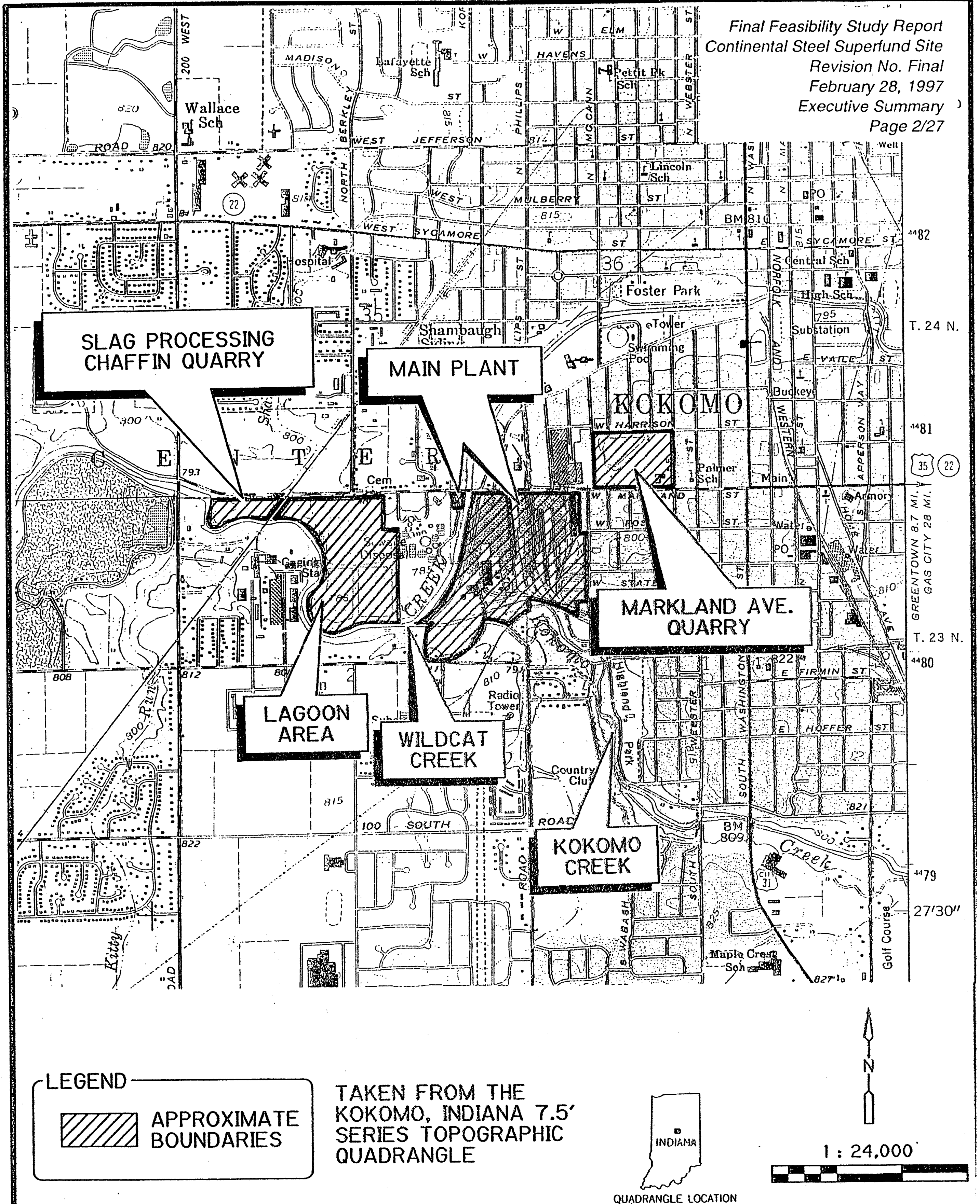

CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
FEASIBILITY STUDY
SITE LOCATION MAP

CDM
environmental engineers, scientists, planners, & management consultants

Figure No. 1

ATTACHMENT 2

List of Documents Reviewed

ATTACHMENT 2 - List of Documents Reviewed

- Interim Record of Decision, September 1997
- Final Record of Decision, September 1998
- Action Memorandum, April 1997
- Baseline Human Health Risk Assessment, February 21, 1997
- Final Feasibility Study, February 28, 1997
- Continental Steel Superfund Site Contract 1 Geological Investigations, October 23, 2001
- Groundwater Sampling Results, Continental Steel Superfund Site (Report not dated, data collected June 2002 through August 2001.)
- Health Consultation, Continental Steel Corporation, U.S. Department of Health and Human Services, May 8, 2002
- Five-Year Review of the Baseline Risk Assessment for the Continental Steel Superfund Site, Ecology & Environment, June 13, 2002
- NCRA Remedial Action Completion Report, Radian Intl., September 15, 1999
- Evaluation of Sediments in Wildcat and Kokomo Creeks, CH2MHill , March 2002

ATTACHMENT 3

Table Documenting Changes in Standards and Updated Citations for Indiana ARARs

ATTACHMENT 3 - Table Documenting Changes in Standards and Updated Citations for Indiana ARARs

Source and Description	Former Citation	Current Citation
Air Pollution Control Board. General Provisions for major new sources including ambient air quality standards	326 IAC 1-1	326 IAC 1-3
Air Pollution Control Board. New sources which have the potential to emit 25 tons per year of a hazardous pollutant must apply for a Part 70 permit	326 IAC 1-1	326 IAC 2-1
Air Pollution Control Board. Sets criteria that sources which emit (~~3 lbs/hour or~~) * 15 lbs/day of volatile compounds need to register with the Office of Air Management	326 IAC 8-6	
Solid Waste Management Board. Sets requirements for disposal of PCBs at concentrations which exceed 50 ppm and separate requirements for those containing between 2 ppm and 50 ppm.	329 IAC 4	329 IAC 4.1
Water Pollution Control Board. Sets requirements for Water Quality Effluent and includes minimum Surface Water Quality Standards (~~and Interim Groundwater Quality Standards~~*).	327 IAC 1-6 and 2-1-1.5 and 2-1-7	327 IAC 1-6 and 2-1-1.5 (327 IAC 2-1-7 repealed)
Solid Waste Management Board. Solid Waste Management siting and design standards for solid waste land disposal facilities. Prohibits solid waste boundary of new solid waste land disposal facility from wetlands in violation of Section 404 of the Clean Water Act, as amended; and within the floodplain unless the waste is protected from flood water inundation by a dike; and establishes design standards for construction/demolition sites and restricted waste sites.	329 IAC 2-10	329 IAC 10-163
Solid Waste Management Board. Disposal of PCB wastes (same standards as 40 CFR 761).	329 IAC 4	329 IAC 4.1-4
Solid Waste Management Board. Describes the applicability and application requirements for permits.	329 IAC 2-5	329 IAC 10-5-2
Indiana Department of Environmental Management. Provides risk-based voluntary clean-up concentration.	Indiana Department of Environmental Management, Voluntary Remediation Program, 1995.	RISC Technical Resource Guidance Document, September 5, 2000.

* This portion of the requirement was not included in current updated rule.

ATTACHMENT 4
Final Report, Baseline Risk Assessment Review

ATTACHMENT 4-
Five-Year Review of the Baseline Risk Assessment for the Continental Steel Superfund Site

The purpose of a five-year review is to determine whether the selected remedy at a site is or will be protective of human health and the environment. As part of the technical review of the remedy, a review of the baseline risk assessment (BRA) is required primarily to address the following question:

> Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

This review of the BRA for the Continental Steel Superfund Site (CSSS) is divided into two main sections that focus on the human health risk assessment (Section A) and the ecological risk assessment (Section B). Each review outlines the exposure areas and exposure scenarios that were evaluated in the risk assessment, then answers a series of specific questions about changes in the exposure assumptions, screening criteria, and toxicity values that were employed in the risk assessment. The degree to which the changes increase estimated risks and thereby affect the protectiveness of the established remediation goals; and whether remediation goals need to be modified to maintain protectiveness are evaluated.

A. Baseline Human Health Risk Assessment Review

The CSSS, which includes a total area of about 183 acres, is composed of a former steel manufacturing facility (Main Plant), a former quarry that was used for disposal of steel processing wastes (Markland Avenue Quarry), former pickling liquor treatment lagoons (Acid Lagoon area), and a Slag Processing Area. Soils in these source areas are contaminated with volatile and Semivolatile organic chemicals, polychlorinated biphenyls, and metals as a result of releases from past operations. Contaminants have migrated from these sources down to groundwater. Groundwater, surface runoff, and past discharges from operations at the Main Plant and Acid Lagoon area have carried site-related contaminants to Kokomo Creek and Wildcat Creek, which border the site.

The site is located in a mixed residential, commercial, and industrial area that is zoned for general use. While land use in the area immediately surrounding most of the site is industrial, the areas adjacent to the Markland Avenue Quarry and east of the Main Plant are residential. Evidence suggests that wind may have carried contaminated soil from the site to nearby residential properties. Although fencing surrounding the Main Plant, the Quarry, and the Acid Lagoon area may discourage trespassing in those areas, it cannot prevent trespassing entirely, especially over the long term. The Slag Processing Area is unfenced, allowing unimpeded access to trespassers. The creeks adjacent to the site are also accessible and may be used recreationally for wading or fishing (though there is a fishing advisory for Wildcat Creek).

In the BHHRA, the site was evaluated as six separate exposure units -- the four source areas described above, Site-Wide Groundwater, and Kokomo and Wildcat Creeks. Based on the existing conditions, the following current/future exposure scenarios were evaluated: a trespasser scenario at all four source areas; a recreational scenario for Kokomo and Wildcat Creeks; and a nearby off-site resident scenario for the Main Plant and the Markland Avenue Quarry. Trespassers who enter any of the on-site source areas could be exposed to soil contamination through direct contact (ingestion and dermal) routes and, to a lesser extent, by inhalation of airborne dust and possibly vapors from higher levels of volatile contaminants in some areas. Trespassers might also come into contact with contaminated water that has accumulated in unfilled portion of the Quarry and in the basements of abandoned buildings within the Main Plant. Recreational users of the creeks may come into direct contact with contaminants in surface water and sediments, and possibly by ingestion of fish caught from the creeks. Off-site residents may be exposed to soil contamination in their yards by direct contact and inhalation routes and, if they have home gardens, by ingestion of produce grown in contaminated soils. Residents might also be exposed to vapors that have infiltrated to indoor air from volatile contaminants in subsurface soil and groundwater.

It is unlikely that groundwater near the site is being used or would be used as a drinking water supply, since the area is served a municipal water supply system that obtains water from upgradient sources. But because such use could not be ruled out entirely, the BHHRA included a hypothetical residential groundwater use scenario to assess risks that would be associated with potential groundwater use exposures (water ingestion, dermal contact, and inhalation of contaminants released from water to air).

Future use scenarios were selected for the four source areas based on expected or probable future use. For the Markland Avenue Quarry and Slag Processing Area, the BHHRA evaluated both a future residential scenario and a future commercial/industrial scenario, since either use is plausible, and also a construction scenario, since redevelopment for either purpose will involve construction in these areas. Because the Main Plant cannot be converted to residential use due to a covenant in the deed, a future commercial/industrial scenario was assumed along with a construction scenario for redevelopment. For the Acid Lagoon area, which was slated for use as a Corrective Action Management Unit (CAMU), a future commercial/industrial use was assumed. Future on-site residents may be exposed to site contamination by the same routes as current off-site residents. Most of the same routes also apply to future commercial/industrial workers at the site. During redevelopment, construction workers could be exposed to soil contaminants by direct contact and inhalation routes. They might also come into direct contact with contaminated water in the Quarry and in buildings at the Main Plant. It is expected that the water would be removed from those areas during redevelopment, eliminating those potential exposures for future site workers or residents.

Not all of the exposure routes mentioned for the scenarios above were carried through the quantitative assessment. Table A-1 outlines the exposure scenarios that were evaluated in the BHHRA, lists all the exposure routes that were considered, indicates whether or not each route was evaluated quantitatively for each scenario/ location combination, and provides the reasons that routes were eliminated from the quantitative assessment. Generally, direct contact routes for were carried through the quantitative assessment (for at least one receptor group) while most other routes were screened out or eliminated for other reasons.

Generally, the exposure input values that were used to calculated exposures for the selected pathways were standard default values recommended by EPA or, in cases where standard default valued were not available, conservative estimates based on data and recommendations in EPA's Exposure Factors Handbook (EPA 1997) or other EPA sources. The ages and body sizes of the receptors, as well as the setting and the nature of expected exposures were taken into consideration. Exposure values were selected to reflect the long-term reasonable maximum exposure (RME) and central tendency exposure (CTE) of each receptor group.

A.1. In the time since the BHHRA was prepared, have there been changes in the site conditions, site setting, or the existing or anticipated land uses at the site? If so, do the changes require that additional pathways or receptor groups be evaluated or that any pathway be re-evaluated using more protective exposure input assumptions in order to avoid underestimating potential risks?

While current conditions and land uses at the site are the same as described in the BHHRA, alternative future land uses have been proposed for two of the exposure units that were evaluated in the BHHRA, the Main Plant and the Slag Processing Area. For the Main Plant, instead of the future commercial/industrial scenario that was assumed in the BHHRA, conversion of part of this area for recreational use (e.g. park, ball fields) has been proposed. At the Slag Processing Area, where future residential use and commercial/industrial use were both evaluated, development for a firing range is now being considered.

In both cases, potential exposures under the proposed land uses involve the same routes of exposure as the scenarios that were evaluated in the BHRRA (i.e. soil ingestion, dermal contact, and possibly inhalation of airborne contaminants), and it is unlikely the magnitude of exposures under the new scenarios would be any greater than those estimated for future workers and residents in the BHHRA. Even though future visitors to a park could include children, whose rates of intake relative to body weight are generally assumed to be greater than those of adults, the overall exposures and risks of visitors are likely to be less than the estimates for workers at the Main Plant, because their expected exposures would be relatively brief and infrequent compared to standard worker assumptions (five workdays per week, 50 weeks per year for up to 25 years). This would also be true of users of a firing range at Slag Processing Area, since their expected exposures would likely be considerably less frequent than the standard worker or residential assumptions. For a full-time worker at the firing range, potential exposures would be expected to be similar to workers in an industrial setting, and the standard worker exposure assumptions are entirely reasonable.

The risks estimated for these areas and presented in the BHHRA can be considered protective for the alternative uses proposed; therefore further evaluation is not necessary.

A.2. Have there been changes in the ARARs or TBC values that were used for screening purposes in the COPC selection process for the BHHRA? If so, do the changes include lower screening values that lead to the identification of additional COPCs in any of the exposure media? Are risks associated with newly identified COPCs greater than acceptable target levels?

In the BHHRA, various screening criteria were used to identify COPCs for the following exposure media and exposure areas: soil in the four on-site source areas and the two adjacent off-site residential areas, surface water in the Markland Avenue Quarry and in Kokomo and Wildcat Creeks, sediment in Kokomo and Wildcat Creeks, and site-wide groundwater in the shallow, intermediate, and lower aquifer. The screening criteria were either risk-based concentrations or regulatory criteria considered to be health-protective. Generally, if the maximum detected concentration of a chemical in a given exposure medium and location was greater than its screening value, the chemical was identified as a COPC, otherwise it was screened out. In some cases, chemicals with concentrations exceeding screening criteria were eliminated because the detection frequency was low, the concentrations were similar to background levels, or the chemical was not site-related.

In the time since the BHHRA was completed, some of the risk-based screening values have been revised (due to revised toxicity estimates) and some regulatory criteria have become obsolete, replaced by different criteria. Changes in the screening criteria and the effects on COPC selection for each exposure medium are discussed below. Although exposure point concentrations and associated risks could not be reliably calculated for added COPCs without the original data sets, worst-case risks have been estimated from the maximum concentrations. Except for arsenic in shallow groundwater (see discussion below), the risks associated with newly identified COPCs appear to be below levels of concern and negligible in comparison to the risk estimates already included in the BHHRA.

Soil

The screening criteria used for most chemicals in soil were adapted from the risk-based concentrations (RBCs) developed by EPA Region III (EPA 1996) for residential soils or commercial/industrial soils. The Region III RBCs were calculated using either a target cancer risk of $1x10^{-6}$ (the low end of the risk range regarded as acceptable by EPA) or a hazard index (HI) for non-carcinogens of 1 (the benchmark below which non-cancer risks would not be expected). To minimize the chance of overlooking any significant risks, the EPA Region III values were reduced by a factor of 10 for screening, to concentrations corresponding to either a cancer risk of $1x10^{-7}$ or an HI of 0.1. Residential soil screening values were applied to exposure areas where land use is currently residential (off-site areas near the Main Plant and Markland Avenue Quarry) or where future land use might be residential (Markland Avenue Quarry and Slag Processing Area). Commercial/industrial soil screening values were applied to the remaining exposure areas (Main Plant and Acid Lagoon area). Note that the screening values used for lead and polychlorinated biphenyls in soil in the BHHRA were not based on RBCs, but were obtained from EPA soil screening guidance (EPA 1994).

Since the BHHRA was completed, there have been revisions to the EPA Region III RBCs (EPA 2002a) reflecting additions or changes in the toxicity values for some chemicals. The risk-based screening values have changed accordingly. Tables A-2 and A-3 list all chemicals that were detected in soils in the "residential soil" areas and the "non-residential soil" areas, respectively, and indicate where screening values have been added or where current risk-based screening values are more stringent (lower) than the original screening values. The tables also indicate where chemicals that were previously screened out would now be included as COPCs as a result of the revisions to screening values.

Table A-2 for "residential soils" indicates that the only COPCs to be added as a result of more stringent screening values are chromium and Aroclor 1254 in the residential area near the Quarry. The maximum chromium concentration (38 mg/kg) is less than twice as great as its current screening concentration (23 mg/kg based on a target HI of 0.1 for hexavalent chromium), which indicates that the HI associated with chromium exposure would be less than 1, the benchmark for possible non-cancer effects. The maximum concentration of Aroclor 1254 (0.68 mg/kg) is about 20 times greater than current screening concentration (0.032 mg/kg based on a target cancer risk of $1x10^{-7}$ for residential exposure). This comparison indicates that the estimated cancer risk to a resident from exposure to Aroclor 1254 at that level would be about $2x10^{-6}$, which is well within the acceptable range.

The situation is similar for "non-residential soils". Table A-3 shows that while screening values for 14 of the chemicals detected are now more stringent, the only COPCs to be added as a result are Aroclor 1254 at the Acid Lagoon area and trichloroethene (TCE) at the Acid Lagoon area and the Main Plant. The maximum concentration of Aroclor 1254 detected in the Acid Lagoon area (0.55 mg/kg), less than twice the current industrial soil screening concentration for PCBs (0.29 mg/kg), indicating that the associated cancer risk to future site workers would be less than $1x10^{-6}$. The maximum concentration of TCE detected in the Acid Lagoon area (22 mg/kg) is about 16 times greater than its current screening value (1.4 mg/kg based on a target cancer risk of $1x10^{-7}$), indicating that the associated cancer risk to workers would be about $2x10^{-6}$, again within the acceptable range. The estimated cancer risk to workers from TCE in soil at the Main Plant, at a maximum concentration of 5.6 mg/kg, would be less than $1x10^{-7}$.

Surface Water
According to the BHHRA, chronic water quality criteria from Indiana Water Quality Regulations or Federal chronic ambient water quality criteria were used as screening criteria for surface water. Generally, the surface water screening values that are listed in the BHHRA do not match current water quality criteria.
Of the water quality criteria that are currently available, the human health values for non-drinking water from ambient water quality standards developed by Indiana's Office of Water Quality seem most appropriate for screening surface water contaminants for the BHHRA. In cases where non-drinking values have not been established, drinking water standards were used for screening.

Table A-4 lists all chemicals that were detected in surface water, either in the Markland Avenue Quarry or in Kokomo and Wildcat Creeks, and identifies which chemicals now have lower screening values. Although current surface water screening values for ten chemicals are lower than the original screening values, they are still greater than the maximum concentrations reported in surface water samples.

Sediment
Because there were no human health-based criteria available for sediment, the residential soil screening values were used to screen chemicals in sediment. Table A-5 lists all the chemicals that were detected in sediment and indicates which chemicals now have new or more stringent soil screening values. Despite changes in the screening values for 14 chemical, no new COPCs were identified in sediment as a result.

Groundwater
Chemicals concentrations detected in groundwater in the shallow, intermediate, and lower zones were compared to available drinking water MCLs and risk-based screening values that were based on EPA Region III RBCs for tap water (concentrations reduced by a factor of 10 for screening). Generally, a chemical was identified as COPC if the maximum detected concentration was greater than its risk-based screening concentration and its drinking water MCL (if an MCL had been established). Since the BHHRA was completed, there have been revisions to the tap water RBCs reflecting additions or changes in the toxicity values for some chemicals, and risk-based screening values have changed accordingly. MCLs are currently the same as they were when the BHHRA was completed, but since the MCL for arsenic will soon drop from 0.05 mg/L to 0.01 mg/L (EPA 2001a), the lower value should be used be used for screening. Table A-6 lists all chemicals detected in any of the three groundwater zones and indicates which currently have more stringent screening criteria and where additional COPCs are identified as a result.

In shallow groundwater, added COPCs include arsenic (due to the lower MCL) and cobalt (due to a lower risk-based screening value). The maximum concentration of cobalt (0.13 mg/L) is less than twice a great as the tap water screening value (0.073 mg/L based on a target HI of 0.1), indicating that the associated HI from exposure to this level in drinking water would be below a level of concern. On the other hand, the maximum concentration of arsenic (0.014 mg/L) is about 3000 times greater than its risk-based screening value (0.0000045 mg/L based on a target cancer risk of $1x10^{-7}$), indicating that the associated cancer risk from exposure to this level in drinking water would be about $3x10^{-3}$, exceeding the risk range that is generally regarded as acceptable ($1x10^{-6}$ to $1x10^{-4}$). Although the actual exposure point concentration for arsenic in shallow groundwater would likely be lower than the maximum, this analysis suggests arsenic levels in shallow groundwater zone could potentially pose an unacceptably high cancer risk and could be significant contributor to the total risks estimated for use of shallow groundwater.

Table A-6 indicates that there are no additional COPCs in the intermediate zone, but that acetone and naphthalene should be identified as COPCs in the lower groundwater zone, due to lower risk-based screening values. The maximum concentration of acetone (0.24 mg/L) and the maximum concentration of napth; thalene (0.003 mg/L) detected in the lower zone are less than five times their respective screening concentrations, which are both based on a target HI of 0.1, indicating that HIs associated with potential exposures to these chemicals would be below a level of concern.

A.3. For chemicals of potential concern (COPCs) identified and evaluated in the BHHRA, have new toxicity values been introduced or have the original toxicity values been revised in the direction of greater toxicity (i.e. to higher cancer slope factors or to lower reference doses)? If so, are estimated risks associated with a newly introduced toxicity value or the increases in risk associated with a revised toxicity value significant (i.e. greater than the selected target risk level)?

The cancer slope factors (SFs) and noncancer reference doses (RfDs) for site COPCs that were used in the BHHRA are listed in Tables A-7 and Tables A-8, respectively, along with current toxicity values that were developed after the BHHRA was completed. The sources of all toxicity values are referenced in these tables. The preferred source of toxicity values is EPA's Integrated Risk Information System (IRIS; EPA 2002b), a database of up-to-date toxicity information that contains EPA-verified SFs and RfDs, meaning that the data and procedures used in their derivation have been thoroughly reviewed and approved by Agency Workgroups. Toxicity values from other EPA sources may be used to evaluate COPCs when values from IRIS are not available, but it should be recognized that these provisional RfDs and SFs have not undergone the same rigorous review process as EPA-verified values.

In cases where a new toxicity value has been introduced or where the current value represents an increase in toxicity, Tables A-7 and A-8 indicate that further evaluation is required. Accordingly, risks associated with the following should be calculated or recalculated:

- Higher oral SFs for benzene and TCE (oral and dermal exposures)
- Higher inhalation SFs for tetrachloroethene (PCE) and TCE
- New oral RfDs for 1,2-dichloroethene, 2-methylnaphthalene, benzene, iron, and vinyl chloride; and lower oral RfDs for benzene, beryllium, and TCE (oral and dermal exposures)
- New inhalation RfDs for beryllium and vinyl chloride, and lower inhalation RfDs for 1,2-dichloroethane and chloroform.

The COPCs identified in soil, surface water, sediment, and groundwater in the various exposure units and carried through the quantitative assessment were reviewed to determine which exposures would be affected by the toxicity changes described above. The results are discussed by exposure medium below.

Soil
A review of the COPCs identified for surface soil exposures on-site and off-site areas shows that the soil COPCs for the Main Plant, the Markland Avenue Quarry, and the Slag Processing do not include any of the chemicals requiring re-evaluation for toxicity changes.

At the Acid Lagoon area, iron and beryllium are among the soil COPCs that were identified. With regard to beryllium, the dust inhalation route for soils was not carried through the quantitative assessment, but was screened out by showing that dust concentrations measured at the Main Plant were too low to pose any significant cancer risk from the levels of contamination present in the soil (see Appendix C-2 of the BRA). A similar analysis can be applied to the potential risk from inhalation of beryllium in soil at the Acid Lagoon area. With a beryllium concentration of 0.713 mg/kg in soil (the exposure point concentration calculated for the RME case), and an acceptable concentration for beryllium in air of 7×10^{-4} μg/m^3 (from the EPA Region 3 RBC table), the acceptable concentration of respirable dust in air would be:

$$C_{a\text{-}dust} = C_{a\text{-}Be} / (C_{s\text{-}Be} \times CF)$$

where

$C_{a\text{-}dust}$ = acceptable respirable dust concentration air (μg/m^3)

$C_{a\text{-}Be}$ = acceptable concentration for beryllium air = 7 x 10^{-4} µg/m^3
$C_{s\text{-}Be}$ = beryllium concentration in soil = 0.713 mg/kg
CF = conversion factor = 10^{-6} kg/mg

$C_{a\text{-}dust}$ = (7 x 10^{-4} µg/m^3) / (0.713 mg/kg x 10^{-6} kg/mg) = 980 µg/m^3

The highest concentration of total airborne dust measured at the Main Plant was 63 µg/m^3, well below the calculated respirable dust concentration that would be protective for beryllium. Assuming that airborne dust levels at the Acid Lagoon area are similar to the levels at the Main Plant, the risks associated with inhalation of beryllium would be well below levels of concern.

With regard to potential non-cancer health risks from exposure to iron in the Acid Lagoon area, the receptor group with the greatest estimated exposure was trespassers. Under the RME case, their estimated chronic daily intake of iron from incidental ingestion of soil with an iron concentration of 211,000 mg/kg was 0.273 mg/kg-day. (See Appendix D in the BRA for details of the intake calculation. Dermal exposures to iron, expected to be minor compared to ingestion, were not estimated in the BHHRA). The HI is calculated as:

HI = CDI / RfDo

where

CDI = chronic daily intake (mg/kg-day)
RfDo = oral reference dose (mg/kg-day)

Using the estimated RME intake and the new provisional oral RfD for iron, the HI would be:
HI = (0.273 mg/kg-day) / (0.3 mg/kg-day) = 0.9

The HI for iron is less than 1.0, indicating that this exposure is unlikely to cause any adverse health effects. (Dose additivity from other chemicals is not an issue the associated critical effect, iron overload, does not apply to any other COPCs.) The risk estimates for soil are not significantly increased by toxicity changes.

Surface water
Potential exposures to surface water contamination in Kokomo and Wildcat Creeks from incidental ingestion was evaluated for recreational receptors. (Dermal contact was not evaluated on the grounds that exposure would likely be sporadic and brief, and minor in comparison to the ingestion route.) Of the COPCs in surface water at Kokomo and Wildcat Creeks, the only one affected by a toxicity change is iron, which has a new provisional oral RfD. With an exposure concentration of 0.49 mg/L under the RME case, the estimated intake for trespassers was 1.66 x 10^{-4} mg/kg-day. The HI calculated for iron ingestion from the new RfD is

HI = (1.66 x 10^{-4} mg/kg-day) / (0.3 mg/kg-day) = 5.5 x 10^{-4}

This value is well below the 1.0 benchmark, indicating that no adverse health effect would be expected.

Potential exposures to surface water from ingestion and dermal contact were evaluated for trespassers at the Markland Avenue Quarry. Among the COPCs identified in surface water at the Quarry is TCE, which now has a lower oral RfD and a higher oral SF. (Note that these are all provisional toxicity values that have not been verified by EPA.) Table A-9 shows the effect of the revised toxicity values on the estimated risks to trespassers from exposure to TCE and on total estimated risks. The HI for noncancer effects is calculated by dividing estimated intake by the oral RfD (in exactly the same way as shown for iron above). The cancer risk is calculated by multiplying the intake and the SF together.

Cancer risk = LADI x SFo

where

LADI = lifetime average daily intake
SFo = oral slope factor

For TCE in surface water at the Quarry:

$$\text{Cancer risk} = 3.84 \times 10^{-4} \text{ mg/kg-day} \times 0.4 \text{ (mg/kg-day)}^{-1} = 1.5 \times 10^{-4}$$

As Table A-9 shows, the 20-fold decrease in the oral RfD for TCE increased the estimated HI from 0.56 to 11. The new HI is greater than the benchmark of 1.0, indicating a possibility of non-cancer health effects. Similarly, due to a 36-fold increase in the SF, the estimated cancer risk for TCE increased from 4.2×10^{-6} to 1.5×10^{-4}. The new estimate of cancer risk is slightly above the range generally regarded as acceptable by EPA.

It should be noted that the exposure point concentration used for TCE, 3.4 mg/L, is the maximum concentration that was detected in 13 surface water samples from the Quarry. The actual long-term average exposure concentration for TCE may be considerably lower than this maximum. Note also that the estimated dermal absorption of TCE, which is more than 6 times greater than the estimated exposure from ingestion, may be a gross overestimate. Dermal exposure was calculated in the BHHRA using a dermal permeability constant (PC) of 0.23 cm/hr (derived from measurements in animals), rather than the lower modeled value of 0.016 cm/hr that was recommended in EPA's 1992 dermal guidance (EPA 1992). Given the uncertainties associated with the dermal exposure estimates for TCE and the likelihood that actual exposures are at least an order of magnitude lower, the TCE in surface water at the Quarry probably does not pose any real health threat to site trespassers.

Sediment

Potential exposures of recreational receptors to contaminants in creek sediments through incidental ingestion and dermal contact routes (for PAHs and PCBs) were evaluated for six separate reaches in Kokomo and Wildcat Creek. The same COPCs were evaluated for all six reaches. Since the highest risks associated with sediment exposures were reported for Reach 4 (the segment of Kokomo Creek that runs through the south end of the Main Plant), and the lowest risks were associated with Reach 6 (Wildcat Creek upstream of the Main Plant, these two creek segments were selected to demonstrate the impact of toxicity increases. Tables A-10 and A-11 shows the effects of the revised toxicity values on the estimated risks to recreational users of the creeks from oral and dermal exposures to the COPCs in sediment at Reach 4 and Reach 6, respectively. Four COPCs were affected: beryllium, which now has a lower RfD than previously; and 2-methylnapththalene, iron, and vinyl chloride, for which new RfDs have been developed. Both tables show that the HIs associated with the affected COPCs in sediment are all below the 1.0 benchmark, and that the effect on the total HI (from all COPCs in sediment) is minor.

<u>Groundwater</u>

The highest of the potential risks posed by groundwater contamination are associated with its hypothetical use as a residential water supply, with exposures occurring through water consumption, dermal contact during baths or showers, and inhalation of contaminants released to indoor air. Although the text of the BHHRA explains that exposures and risks were calculated well by well and results were mapped to show the variability and spatial distribution of risks in each of three groundwater zones (shallow, intermediate, and lower), Appendix D includes just one set of exposure/risk calculations for each groundwater zone. The groundwater exposure point concentrations were presumably calculated using the data from all of the wells in each of the respective zones. Using the RME cases from those risk calculations, Tables A-12, A-13, and A-14 show the impact of the new and revised toxicity values on the estimated risks associated with residential use of the shallow zone, the intermediate zone, and the lower zone, respectively. Current risk estimates are presented alongside the original risk estimates for the affected COPCs. Significant increases in risk are highlighted in bold print.

The greatest increases in estimated non-cancer risks from use of shallow zone groundwater are associated with oral and dermal exposure to iron and TCE, which together now account for more than 70% of the total HI. The oral/dermal HI calculated for iron (at an exposure concentration of 1,200 mg/L in shallow groundwater) is 250, and the oral/dermal HI for TCE (at a concentration of 0.959 mg/L) is now 200, both many times greater than the benchmark of 1.0 for potential non-cancer effects. The oral/dermal HI for vinyl chloride and the inhalation HI for chloroform, although greater than 1.0, are minor contributors to the total HI for shallow groundwater use. Due to the higher SFs for TCE, the cancer risks associated with exposures to TCE in shallow groundwater also increased significantly, to 5.9×10^{-3} for the oral/dermal routes and 3.2×10^{-3} for the inhalation route, well above the 10^{-6} to 10^{-4} range that is generally regarded as acceptable. TCE alone now accounts for more than 70% of the total cancer risk estimated for use of shallow groundwater.

The greatest increases in the estimated risks for use of groundwater from the intermediate and lower zones are associated with TCE. Based on the previous estimates, the risks posed by TCE in both zones were already unacceptably high. At a TCE concentration of 9.8 mg/L in the intermediate zone, the cancer risks for oral/dermal and inhalation exposures are now 6 x 10^{-2} and 3.2 x 10^{-2}, respectively, while the HI for oral/dermal exposure is now 2,000. HIs greater than 1.0 for iron and vinyl chloride suggest a possibility of non-cancer effects from those chemicals also, but much less than from TCE. Compared to the intermediate zone, the TCE concentration and associated risks in the lower zone are about half as great, with cancer risks of 2.9 x 10^{-2} and 1.6 x 10^{-2}, respectively, and an oral/dermal HI of 1,000. TCE now accounts for the bulk of the total risks, both cancer and non-cancer, in both the intermediate and lower groundwater zones.

A.4. Are the existing remediation goals (presented in the feasibility study) still adequately protective of human health or should new remediation goals be developed in light of the additional risks associated with newly identified COPCs or revision of toxicity values?

There is no need to revise existing remediation goals for soil, surface water, and sediment, since the estimated risks for these media were not significantly increased as a result of the changes in toxicity estimates or screening criteria used in the BHHRA. Only groundwater risks were significantly impacted by these changes.

Based on the original risk estimates for groundwater use, remediation goals were set for the following chemicals: acrylonitrile, PCBs, 1,1-dichloroethene, 1,2-dichloroethene benzene, manganese, chloroform, methylene chloride, PCE, TCE, and vinyl chloride. In most cases, drinking water MCLs were adopted as the remediation goals. Since manganese has no MCL, the secondary MCL (which is based on aesthetic rather than health considerations) was adopted as the remediation goal. For acrylonitrile, which has no MCL or secondary MCL, a risk-based remediation goal was calculated based on residential water use assumptions. Because there have been substantial changes in toxicity values for TCE, with corresponding increases in the estimated risks, evaluation of the established remediation goal for TCE in groundwater is necessary to ensure that it is still adequately protective. Remediation goals should also be established for arsenic and iron in groundwater, because the estimated risks associated with these chemicals, which were not included in the BHHRA, exceed acceptable levels.

New goal for arsenic in groundwater

A remediation goal was not established for arsenic, because arsenic was not originally identified as a COPC in groundwater. Since arsenic has been now identified as a COPC in shallow groundwater and the potential risks from exposure appear to be significant, a remediation goal should now be established for arsenic in groundwater. The exposure assumptions for oral and dermal exposure outlined in the BHHRA can be used to calculate arsenic exposure and associated risks from groundwater use, assuming that the new MCL for arsenic (0.01 mg/L) is adopted as the remediation goal. Since dermal intake during showering was assumed to be equal to 30% of the intake by ingestion, using RME assumptions for the adult resident, the cancer risk from oral and dermal exposure would be calculated as:

$$\text{Cancer risk} = 1.3 \times \frac{C_w \times IR_{w-a} \times EF \times ED}{BW_a \times AT_c} \times SFo$$

where

C_w = contaminant concentration in water (mg/L)
IR_{w-a} = adult ingestion rate for drinking water (2 L/day)
EF = exposure frequency (350 days/year)
ED = exposure duration (30 years)
BW_a = adult body weight (70 kg)
AT_c = averaging time for cancer, 70-year lifetime (25,550 days)
SFo = oral slope factor

The oral/dermal cancer risk for arsenic exposure at a concentration equal to the new MCL is:

$$\text{Cancer risk (oral/dermal)} = 1.3 \times \frac{0.010 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/year} \times 30 \text{ years}}{70 \text{ kg} \times 25{,}550 \text{ days}} \times 0.4 \text{ (mg/kg-day)}^{-1}$$

$= \mathbf{6.1 \times 10^{-5}}$

The estimated cancer risk for arsenic at the MCL is within the acceptable range.

For non-cancer effects based on RME assumptions for the resident child, the HI from oral/dermal exposure would be calculated as:

$$HI\ (oral/dermal) = 1.3 \times \frac{(C_w \times IR_{w\text{-}c} \times EF \times ED) / (BW_c \times AT_n)}{RfDo}$$

where

C_w = contaminant concentration in water (mg/L)
$IR_{w\text{-}c}$ = child ingestion rate for drinking water (0.8 L/day)
EF = exposure frequency (350 days/year)
ED = exposure duration (6 years)
BW_c = child body weight (16 kg)
AT_c = averaging time for non-cancer, equivalent to ED (2190 days)
RfDo = oral reference dose

The oral/dermal HI for arsenic exposure at a concentration equal to the new MCL is:

$$HI\ (oral/dermal) = 1.3 \times \frac{(.010\ mg/L \times 0.8\ L/day \times 350\ days/year \times 6\ years) / (16\ kg \times 2190\ days)}{(3.0 \times 10^{-4}\ mg/kg\text{-}day)}$$

$= \mathbf{2.1}$

The HI above 1 for children suggests a slight possibility of adverse non-cancer health effects, but this does not necessarily mean that health effects would occur from exposure to arsenic at the MCL level. Note that there are relatively large uncertainties associated with both the exposure and toxicity components of the risk estimate and, therefore, that these estimates are made using a combination of deliberately conservative (health-protective) assumptions in order to avoid underestimating the true risks. The result is likely an overestimate of the true risks. Since the estimated HI for arsenic at the MCL is only two times EPA's benchmark, while the associated uncertainty may be many times greater, it is difficult to justify a remediation goal for arsenic lower than the MCL.

New goal for iron in groundwater

No remediation goal was set for iron in the FS, because no risks were calculated for iron exposure in the BHHRA. With the newly developed RfD for iron, the HI calculated for iron in shallow groundwater was above the acceptable level. Currently, there is no MCL for iron, but there is a secondary MCL of 0.3 mg/L. Assuming that, as was done for manganese, the secondary MCL is adopted as the remediation goal for iron in shallow groundwater, the non-cancer risk would be:

$$HI\ (oral/dermal) = 1.3 \times \frac{(0.3\ mg/L \times 0.8\ L/day \times 350\ days/year \times 6\ years) / (16\ kg \times 2190\ days)}{(0.3\ mg/kg\text{-}day)}$$

$= \mathbf{0.06}$

well below the 1.0 benchmark. The secondary MCL for iron is more than adequately protective. From a health standpoint, the remediation goal for iron in groundwater could be set at a higher level that would still be adequately protective, possibly up to as much as 5 mg/L

$$HI\ (oral/dermal) = 1.3 \times \frac{(5\ mg/L \times 0.8\ L/day \times 350\ days/year \times 6\ years) / (16\ kg \times 2190\ days)}{(0.3\ mg/kg\text{-}day)}$$

$= \mathbf{1.0}$

Evaluation of the goal for TCE in groundwater
The remediation goal for TCE in groundwater was set at the MCL of 0.005 mg/L. The cancer risk from oral/dermal exposure to TCE at this concentration would be:

$$\text{Cancer risk (oral/dermal)} = 1.3 \times \frac{(0.005 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/year} \times 30 \text{ years})}{70 \text{ kg} \times 25{,}550 \text{ days}} \times 0.4 \text{ (mg/kg-day)}^{-1}$$

$$= 1.3 \times (5.87\text{x}10^{-5} \text{ mg/kg-day}) \times 0.4 \text{ (mg/kg-day)}^{-1} = \mathbf{3.1 \times 10^{-5}}$$

Since intake from inhalation of TCE vapors was assumed to be 70% of the oral intake,

$$\text{Cancer risk (inhalation)} = 0.7 \times (5.87\text{x}10^{-5} \text{ mg/kg-day}) \times 0.4 \text{ (mg/kg-day)}^{-1} = \mathbf{1.6 \times 10^{-5}}$$

The estimated total cancer risk for TCE in drinking water at the MCL is:

$$\text{Cancer risk (total)} = (3.1 \times 10^{-5}) + (1.6 \times 10^{-5}) = \mathbf{4.7 \times 10^{-5}}$$

With regard to the non-cancer risk, the oral/dermal HI calculated for of TCE in drinking water at the MCL is:

$$\text{HI (oral/dermal)} = 1.3 \times \frac{(.005 \text{ mg/L} \times 0.8 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years}) / (16 \text{ kg} \times 2190 \text{ days})}{(3.0\text{x}10^{-4} \text{ mg/kg-day})}$$

$$= 1.3 \times (2.4 \times 10^{-4} \text{ mg/kg-day}) / (3.0\text{x}10^{-4} \text{ mg/kg-day}) = \mathbf{1.0}$$

and the HI for inhalation of TCE is:

$$\text{HI (inhalation)} = 0.7 \times (2.4\text{x}10^{-4} \text{ mg/kg-day}) / (1.0\text{x}10^{-2} \text{ mg/kg-day}) = \mathbf{0.02}$$

giving a total HI of 1.0. Since the risks estimated for TCE in drinking water at the MCL do not exceed the levels regarded as acceptable by EPA, this remediation goal appears to be just adequately protective. Note that both the old and new risk estimates for TCE are based on provisional toxicity values that have not gone through the EPA's extensive review process for verification.

A.5 BHHRA Review Summary

The BHHRA was reviewed to determine whether changes in site conditions, screening criteria, or toxicity values that have occurred since the risk assessment was completed would increase the risks previously estimated or introduce additional risks not previously considered, and whether the established remediation goals require modification as a result. Although there were increased risks associated with toxicity changes for a number of COPCs and additional COPCs identified using new screening criteria, they were not significant in most cases. Only risks associated with groundwater use were significantly impacted.

Risks associated with potential exposure to TCE in groundwater increased substantially due to the revisions of the SFs and the oral RfD. Nevertheless, the remediation goal for TCE, which was set at the drinking water MCL of 0.005 mg/L, still appears to be adequately protective. In shallow groundwater, risks associated with exposures to iron and arsenic, which were not evaluated in the original assessment, are estimated to be above acceptable levels. The new MCL for arsenic of 0.010 mg/L should be adopted as remediation goal for groundwater, consistent with the goals already established. The remediation goal for iron in groundwater could be set at its secondary MCL of 0.3 mg/L (as was done for manganese) or a higher risk-based value up to 5 mg/L.

B. Baseline Ecological Risk Assessment Review

The potential for adverse impacts on ecological receptors at the CSSS was evaluated in a baseline ecological risk assessment (BERA). The site was divided into five exposure areas, which were also evaluated in the BHHRA. These exposure areas include the Main Plant, Acid Lagoon area, Slag Processing Area, Markland Avenue Quarry, and Kokomo and Wildcat Creeks. A biological assessment provided information on terrestrial and aquatic ecological receptors present at the CSSS, including the potential presence of threatened and endangered species. Based on the biological assessment, exposure scenarios were developed for the omnivorous American robin, piscivorous great blue heron, piscivorous mink, and insectivorous Indiana bat, a state and federally listed endangered species. The American robin was assumed to be exposed to COPCs in surface soil in the Main Plant, Acid Lagoon area, Markland Avenue Quarry, and Slag Processing Area while the great blue heron, mink, and Indiana bat were assumed to be exposed to COPCs in sediment from Kokomo and Wildcat Creeks. Uptake of COPCs occurs directly through ingestion of contaminated soil or sediment and indirectly through ingestion of food items living in contaminated media (i.e., earthworms, insects, fish).

Standard default exposure parameters recommended by the EPA, such as body weight and ingestion rate, were combined with maximum COPC concentrations to estimate exposures to ecological receptors. However, chemical-specific factors used in estimating exposures and toxicity data have been updated since the BERA was completed. These chemical-specific factors and other components of the BERA were reviewed to determine if updated information leads to unacceptable impacts to ecological receptors at the CSSS. Criteria used to select COPCs were reviewed and updated; changes in site conditions, receptors, exposure pathways, and assumptions are identified; and chemical toxicity values were updated. In addition, RAOs were reviewed to determine if revisions are necessary because of new or revised information.

B.1. In the time since the BERA was prepared, have there been changes in the site conditions, site setting, or the existing or anticipated land uses at the site? If so, do the changes require that additional pathways or receptor groups be evaluated or that any pathway be re-evaluated using more protective exposure input assumptions in order to avoid underestimating potential risks?

Current land uses and conditions at the site are not significantly different from those described in the BERA. However, as described in Section A of this memorandum, proposed future land uses for the Main Plant and Slag Processing Area have changed. A recreational area is being considered for the Main Plant and a firing range is being considered for the Slag Processing Area. The proposed changes in *future* land use for both areas are not expected to have any greater impact on receptors of concern than the future land use plans previously evaluated in the BERA.

The presence or occurrence of ecological receptors previously observed at the CSSS could not be updated without a site visit. According to the U.S. Fish and Wildlife Service, the Indiana bat (*Myotis sodalis*) is still listed as an endangered species that is present in the general vicinity of the CSSS.

No other changes in site conditions have been documented that would lead to an underestimation of risks posed to ecological receptors at the CSSS.

B.2. Have there been changes in the ARARs or TBC values that were used for screening purposes in the COPC selection process for the BERA? If so, do the changes include lower screening values that lead to the identification of additional COPCs in any of the exposure media? Are risks associated with newly identified COPCs greater than acceptable target levels, requiring the establishment of new remediation goals?

The CSSS BERA used the following criteria for selection of COPCs: (1), the frequency of detection must be greater than 5% of the samples; (2), the maximum detected concentration must exceed a maximum background concentration; (3), the chemical must be toxic to ecological receptors and the maximum detected concentration must exceed a minimum benchmark value for potential adverse effects; and (4), the chemical must be site-related. For this review, chemicals were re-screened using updated benchmark values (criteria number three). ARARs and receptor-specific benchmarks may be used to screen chemicals detected onsite. No ecological receptor-specific

ARARs are provided by IDEM although updated ARARs based on human health protection are provided in Section A of this memorandum. Benchmark values that are now more restrictive for COPCs, for each exposure area for soil, sediment, and surface water are listed in Tables B-1 through B-3 and are briefly described below.

Surface Soil Criteria: The criteria used to select COPCs for surface soil included benchmarks for terrestrial plants, earthworms, and soil microorganisms (Will and Suter 1995). These criteria have since been updated by Efroymson et al. (1997a and 1997b). Level B criteria established by the British Columbia Ministry of the Environment – Canada (1989) were used as secondary benchmarks and have since been updated (1995). When benchmarks used in the BERA could not be confirmed and updates from the above sources were not available, updated values were obtained from EPA Region 4 "Recommended Ecological Screening Values for Soil" (Friday 1998). Table B-1 presents soil criteria that are more restrictive for each source area. Anthracene, fluoranthene, pyrene, phenanthrene, mercury, and toluene were previously below benchmark values but now exceed the updated benchmark values.

Sediment Criteria: EPA sediment quality criteria (1993) were used to select COPCs for sediment. Secondary sources of benchmarks used to select COPCs for the CSSS BERA were values provided by the Ontario Ministry of the Environment (1993), the National Oceanic and Atmospheric Administration (NOAA; 1994), and the New York Department of Conservation (NYDEC; 1993). Benchmarks for sediment were updated using alternate EPA sources compiled in the Risk Assessment Information System (RAIS) (ORNL 2002). Included in RAIS are EPA's Office of Solid Waste and Emergency Response (OSWER) and EPA Region IV sediment benchmarks. When benchmarks were not available from these sources, NOAA's Screening Quick Reference Tables (SQRT; Buchman 1999) and values provided by Jones et al. (1997) were used. Table B-2 presents sediment criteria that are more restrictive for each source area. There are no new COPCs for sediment based on updated screening benchmarks.

Surface Water Criteria: Indiana Water Quality Standards (IWQS) were used in the CSSS BERA to identify COPCs in surface water. Secondary benchmark values used were federal ambient water quality concentrations for chronic exposure (EPA 1992) and "lowest chronic value" for daphnids or fish from Suter et al. (1992). All sources of screening levels have been updated (IDEM 2001; EPA 1999a; and Suter and Tsao 1996). The updated criteria were used to screen chemicals detected at the CSSS, using the same order of priority. Table B-3 provides surface water criteria that are more restrictive for each source area. Barium, magnesium, and trichloroethene were previously below benchmark values but now exceed the updated benchmark values.

The CSSS BERA considered only PCBs and mercury as COPCs that may bioaccumulate. Current ecological risk assessment methodology (EPA 2001) considers all chemicals with a log K_{ow} (log of the octanol – water partition coefficient) greater than 3.5 as having the potential to bioaccumulate. These chemicals are all included as COPCs, provided that the maximum chemical concentration is greater than the maximum background concentration and is detected in more than 5% of the samples. Using this new criterion, many semi-volatile organic compounds (SVOCs) were added to the list of COPCs for each exposure area. Table B-4 lists bioaccumulative COPCs for each exposure area that have a log K_{ow} greater than 3.5. New COPCs are shown in bold type.

Based on the review of updated screening benchmarks, many of the newly identified COPCs likely would contribute to risk estimates greater than the HQ benchmark of one. The BERA revealed elevated risks for exposure of ecological receptors to chemicals similar to the newly identified COPCs (SVOCs, metals, VOCs), but these risks were not addressed in cleanup decisions for the CSSS. Cleanup levels for SVOCs, metals, and PCBs for surface soil and sediment for each exposure area were based on results from the BHHRA or background concentrations. Some, but not all, of these cleanup goals also were protective for the ecological receptors evaluated in the BERA. It is not clear why cleanup goals protective of ecological receptors were not developed for all of the COPCs estimated to pose significant risks in the BERA. However, since significant ecological risks were identified in the BERA but not addressed in the ROD, it does not appear that developing cleanup goals for additional similar COPCs would serve a useful purpose.

B.3. For COPCs identified and evaluated in the BERA, have new chemical-specific factors or toxicity values been introduced or have the original values been revised in the direction of greater toxicity (i.e. to greater transfer factors or lower reference toxicity values)? If so, are estimated risks associated with a newly introduced value or the increases in risk associated with a revised value significant (i.e. lead to exceedance of

the target risk level)? Is it necessary to develop new remediation goals or revise existing remediation goals for any medium as a result of the increases in toxicity estimates?

Bioaccumulation factors for soil invertebrates (BAFinv), soil-to-plant (STP) factors, sediment-to-invertebrate/fish (STI/F), and reference toxicity values (RTVs) are used to obtain exposure estimates and calculate potential risks to ecological receptors. The values used in the BERA were obtained from the literature; however, the literature citations were not provided for all values in the BERA text and tables. For this review, currently accepted values provided in the literature were reviewed and used to update the values used in the BERA.

Very few STP, BAFinv, and STI/F factors were used in the BERA, which led to an assumption that 100% of most COPCs in soil or sediment were absorbed by biota growing or living in contaminated media. Updated STP factors are provided by the Bechtel Jacobs Company (1998a) for inorganic chemicals and by RAIS for organic chemicals. Empirically-derived BAFinv factors were taken from the published literature when possible (Sample et al. 1998; Braunschweiler 1996). In the absence of empirically derived values for organic chemicals, BAFinv factors can be calculated using methods described by Menzie et al (1992). STI/F factors have been published by Bechtel Jacobs Company (1998b) and EPA (1998). Table B-5 presents new STP, BAFinv, and STI/F factors for all COPCs. Chemical-specific factors used in the CSSS BERA are shown in parenthesis, when available. Updated chemical-specific factors that are less than one will lead to a reduction in risk while factors that are greater than one will lead to an increase in risk. As can be seen in Table B-5, updated chemical-specific factors generally lead to increased uptake for SVOCs, PCBs, and mercury.

The majority of RTVs used in the BERA were obtained from EPA's Integrated Risk Information System although some RTVs were obtained from published literature. An initial comparison of RTVs from Table 7-5 of the BERA with the RTVs listed in Appendix H of the report revealed discrepancies between RTVs for thallium for the American robin and all COPCs for the Great Blue Heron, except copper and nickel. In the BERA, some RTVs for a specific chemical were used for all receptors due to lack of species-specific toxicity data. This is an acceptable practice; however, allometric scaling should be used to account for differences in body weight to tailor the toxicity data to different species. Due to a lack of species-specific RTVs, all RTVs should be updated using values provided in Sample et al. (1996) and EPA (1999b) and allometry should be used to scale values from test species to the speciesof concern. The majority of the current RTVs are at least an order of magnitude lower than those used in the BERA. This decrease in RTVs indicates that the COPCs are more toxic to the receptor and will result in the calculation of greater HQs than those in the BERA.

Because of the large number of changes identified in the various exposure factors (STPs, BAFinv, and STI/F) and in the RTVs themselves virtually all of the Hazard Quotients estimated in the BERA are likely to have changed. In addition a number of new COPCs have been identified. Since the HQ calculation involves all of these factors, it is difficult to tell which HQs will increase and which decrease without redoing all of the calculations.

In the original BERA most of the HQs for the American robin, the great blue heron, and the Indiana bat exceeded 1. Some were as high as 30,000 to 40,000, however no RAOs were established to address these estimated risks. In fact the only RAO established for which ecological risks were a consideration was that for PCBs. The RAO of 1.0 mg/kg, which was initially established for PCBs in sediment, was based on human health considerations, however the TEC-1 of 1.03 mg/kg for mink was also considered. It is not clear from the ROD why RAOs were not established to mitigate other estimated ecological risks. However since HQs for ecological receptors substantially greater than 1 were estimated in the BERA but not addressed in the ROD, it would not appear useful to recalculate all exposure estimates and HQs for the American robin, Indiana bat, and great blue.

The only ecological risks considered in establishing RAOs were those to the mink. The mink was also the only receptor for which some risks estimated in the BERA were below the benchmark level of one. Since risks to the mink were considered in establishing RAOs for the site and these risks might increase as a result of the updated exposure factors and RTVs, HQs for the mink were recalculated for exposure to selected indicator chemicals from each chemical class. Table B-6 provides the list of COPCs used to update risk estimates and their respective RTVs for the mink. The calculations were performed in the manner described in the BERA, although STI/F factors were used for all calculations. For comparison, risks also were recalculated for exposure of the other ecological receptors to selected COPCs. The RTVs used in updating the calculations for the American robin, great blue heron, and

Indiana bat also are provided in Table B-6. The following equation demonstrates the use of the updated chemical-specific factors for all COPCs:

$$Dose = \frac{SFF \times [(IR_{soil/sed} \times C_{soil/sed}) + (IR_{plant} \times C_{soil} \times STP) + (IR_{inv/fish} \times C_{soil/sed} \times STI/F)] \times ED}{BW}$$

Where:

Dose	= mg COPC per kilogram body weight per day (mg/kg BW-day)
SFF	= Site foraging frequency (unitless)
IR_x	= Ingestion rate of media/food (mg/kg)
$C_{soil/sed}$	= Concentration of COPC in soil or sediment (mg/kg)
STP	= Soil to plant transfer factor, used only for those receptors consuming plants (unitless)
STI/F	= Soil to invertebrate or fish transfer factor, used only for those consuming invertebrates or fish (unitless)
ED	= Exposure duration
BW	= Body weight

Updated exposure and risk calculations for the mink and other ecological receptors are provided in Table B-7. The site-specific PCB SIT/F factor of 5.058 was used in the updated calculations while updated STP factors, BAFinv, and STI/F factors were used for all other calculations. For the mink, updated chemical-specific factors and RTVs led to increases in estimated doses and risks for exposure to COPCs, except Aroclor-1016, in Wildcat and Kokomo Creek sediment. Previous calculations indicated a potential for adverse effects in mink with exposure to PCBs and zinc in sediment only, while the updated calculations reveal a high potential for adverse effects (HQ > 100) with exposure to PCBs, zinc, antimony, and benzo(a)pyrene in creek sediment. Updated risk calculations for the American robin, great blue heron, and Indiana bat are provided in Table B-7 for informational purposes and further reinforce the potential for adverse impacts on ecological receptors.

Threshold effect concentrations equivalent to a HQ of one (TEC-1) for exposure of the mink and Indiana bat to total PCBs were calculated in the BERA to guide cleanup in Wildcat and Kokomo Creek sediment. TEC-1 values were not calculated for other ecological receptors. The TEC-1 value was obtained by back-calculation, using the exposure estimation equation and RTV. The TEC-1 of 1.03 mg/kg for total PCBs for the mink was the most conservative value. However, the final remediation goal selected for total PCBs in creek sediment was 1.00 mg/kg and was based on protection of human health and that value was later increased to 5 mg/kg. For this review, the final remediation goal for total PCBs was input into the exposure estimation equation using updated chemical-specific factors and RTVs to obtain updated HQs for individual Aroclors, shown in Table B-8. The resulting HQ for Aroclor-1248 (the mixture with the greatest associated risk) was 115, assuming a media concentration of 5 mg/kg. The updated HQ range for other PCB mixtures was 1.3 (Aroclor-1016) to 25.5 (Aroclor-1242). Only risk associated with exposure to Aroclor-1016 was near the benchmark level of 1 (HQ = 1.3). Revision of the remediation goal for total PCBs would be necessary to achieve a risk level below the benchmark of 1 for the mink
TEC-1 values were recalculated to determine new remediation goals for exposure of mink to individual Aroclors. The following equation was used to calculate the updated TEC-1 values:

$$TEC-1 = \frac{C_{soil/sed} \times \text{Target } HQ}{\text{Actual} HQ}$$

Where:

TEC-1	= Threshold effect concentration for a hazard quotient of 1
$C_{soil/sed}$	= Concentration of COPC in soil or sediment
Target HQ	= Target hazard quotient is 1
Actual HQ	= Hazard quotient calculated in the BERA for a specific receptor exposure to a COPC

Calculation of TEC-1 values for PCB mixtures using updated inputs yielded values ranging from 0.043 mg/kg (Aroclor-1248) to 3.9 mg/kg (Aroclor-1016), shown in Table B-8. The TEC-1 value of 1.03 mg/kg and final remediation goal of 1.00 mg/kg for total PCBs fall within this updated range of TEC-1 values. However, the final remediation goal of 1.00 mg/kg for total PCBs was subsequently revised to 5.00 mg/kg, which is outside the updated range of TEC-1 values and is less protective than the previous remediation goal.

B.4. BERA Review Summary

A 5-year review was conducted for the CSSS BERA. Based on a review of updated ecological screening benchmarks, new COPCs were identified for each exposure area. In addition, chemicals with a log K_{ow} greater than 3.5 were included as COPCs due to their potential to bioaccumulate. Chemical-specific exposure factors and toxicity values also were updated during the review process. All values have been updated since the BERA was conducted, and the revised values contribute to both increases and decreases in estimated risks to ecological receptors. All HQs for the American robin, great blue heron, and Indiana bat calculated in the original BERA were greater than the benchmark level of one, however these estimated risks were not addressed in the ROD. Risks to the mink were considered in the ROD. HQs for exposure of the mink to SVOCs, metals, and vinyl chloride were below the benchmark level and could increase as a result of updated exposure factors and RTVs; therefore, risks to the mink were recalculated for select COPCs. Significantly increased risk estimates for exposure of the mink to benzo(a)pyrene, antimony, zinc, and PCBs resulted from the updated calculations.

Remediation goals for the site were based mainly on the results of the BHHRA and background concentrations. Since HQs for ecological receptors substantially greater than 1 were estimated in the BERA but not addressed in the ROD, it did not appear useful to recalculate all exposure estimates and HQs for the American robin, Indiana bat, and great blue heron However, a simple comparison of final remediation goals with ecological screening benchmarks for surface soil indicated that final remediation goals for the Markland Avenue Quarry, Acid Lagoon area, and Slag Processing Area were below the benchmarks except for lead in the Acid Lagoon area (remediation goal of 1,096 mg/kg vs screening level of 500 mg/kg). All final remediation goals for the Main Plant exceeded ecological screening benchmarks. Comparison of final remediation goals for sediment to ecological screening benchmarks indicated that remediation goals are not protective of ecological receptors. New TEC-1 values were calculated for several commercial PCB mixtures (Aroclors) based on updated chemical-specific factors and toxicity values to further assess the protectiveness of the final remediation goal for total PCBs. The previously calculated TEC-1 value of 1.03 mg/kg and final remediation goal of 1.00 mg/kg fall within the updated TEC-1 value range of 0.043 to 3.9 mg/kg for select Aroclors; although the updated remediation goal of 5.00 mg/kg does not fall within this range. The latest remediation goal of 5.00 mg/kg is not protective of ecological receptors.

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Table B-5 **Chemical-Specific Factors for COPCs** **Continental Steel Superfund Site** **Kokomo, IN**			
Chemical	**STPs[(a)]**	**BAFinv[(b)]**	**STI/F[(c)]**
Acenaphthene	0.12	**30.3**	**607**
Acenaphthylene	0.17	**30.3**	NA
Anthracene	0.11	**30.3**	**2,600**
Benzo(a)anthracene	0.019	**30.3**	**5,100**
Benzo(a)pyrene	0.011	**30.3**	**9,950**
Benzo(b)fluoranthene	0.011	**30.3**	**9,950**
Benzo(b,k)fluoranthene	NA	**30.3**	**9,950**
Benzo(k)fluoranthene	0.0043	**30.3**	**9,950**
Benzo(g,h,I)perylene	0.0056	**30.3**	NA
Bis(2-ethylhexyl)phthalate	0.055	**30.3**	**360**
Chrysene	0.019	**30.3**	**6,030**
Dibenzo(a,h)anthracene	0.0043	**30.3**	**12,800**
Fluoranthene	0.055	**30.3**	**15,700**
Fluorene	0.11	**30.3**	**1,200**
Indeno(1,2,3-cd)pyrene	0.0056	**30.3**	**13,100**
Pentachlorophenol	0.014	**30.3**	**397**
Phenanthrene	0.082	**30.3**	**3,300**
Pyrene	0.055	**30.3**	**11,900**
Acetone	**52**	**30.3**	0.4
1,1-Dichloroethene	**3.4**	**30.3**	**24.1**
Methylene chloride	**6.7**	**30.3**	**5.3**
2-Methylnaphthalene	0.21	**30.3**	NA
Trichloroethene	**1.5**	**30.3**	**41.6**
Toluene	1.0	**30.3**	**62.7**
Vinyl chloride	1.0	**30.3**	**4.37**
Xylenes	1.0	**30.3**	**160**
Aroclors	0.013 *(0.02)*	**30.3 (3.0)**	**9.016 (5.058)**
Antimony	0.005	0.523	**40**
Arsenic	0.0371	0.523	0.329
Barium	0.1	1.0	NA
Beryllium	0.01	1.0	**42**
Cadmium	0.517 *(0.55)*	**40.7 (4.6)**	**2.822**
Chromium	0.04	**3.16**	0.179
Cobalt	0.054	1.0	NA
Copper	0.123	**1.53**	**2.424**
Lead	0.0377	**1.52**	0.276
Manganese	0.68	0.29	NA
Mercury	1.0	**20.6**	**1.422 (1)**
Nickel	0.0342	**4.73**	0.857
Thallium	0.004	1.0	**1,400**
Zinc	0.358	**12.9**	**3.092**

Notes:

Numbers in parenthesis were values used in CSSS ERA.

Values greter than 1 will lead to increased risk estimates and are printed in **bold** type.

(a) = STP factors from Bechtel Jacobs Company (1998a) and RAIS (2002).
(b) = BAFinv factors for inorganic COPCs from Sample et al. 1998 and Braunschweiler 1996;
BAFinv factors for organic COPC values were calculated using Menzie et al. (1992) methods.
Assumes lipid content of earthworm is 2%, f_{oc} is 0.01.
(c) = STI/F factors for inorganic COPCs and PCBs from Bechtel Jacobs Company (1998b); all other STI/F from EPA (1998).
NA = Not available.

Table A-3
Chemicals Detected in Surface Soil (Non-Residential) - Main Plant, Acid Lagoon area

Chemicals Detected	New and/or Lower Screening Value?	COPC added?	Comment
Inorganics			
Aluminum	no	no	
Antimony	no	no	
Arsenic	no	no	
Barium	no	no	
Beryllium	no	no	
Cadmium	no	no	
Calcium	no	no	
Chromium (as Cr VI)	YES	no	Already a COPC, Acid Lagoon area
Cobalt	YES	no	Max < current screening value
Copper	no	no	
Cyanide	no	no	
Iron	no	no	
Lead	no	no	
Magnesium	no	no	
Manganese	no	no	
Mercury	no	no	
Nickel	no	no	
Potassium	no	no	
Selenium	no	no	
Silver	no	no	
Sodium	no	no	
Thallium	YES	no	Max < current screening value
Vanadium	no	no	
Zinc	no	no	
Pesticides/PCBs			
4,4'-DDD	no	no	
4,4'-DDE	no	no	
4,4'-DDT	no	no	
Aldrin	no	no	
alpha-BHC	no	no	
alpha-Chlordane	no	no	
delta-BHC	no	no	
Dieldrin	no	no	
Endosulfan I	no	no	
Endosulfan II	no	no	
Endosulfan Sulfate	no	no	
Endrin	no	no	
Endrin aldehyde	no	no	
Endrin ketone	no	no	
gamma-BHC	no	no	

gamma-Chlordane	no	no	
Heptachlor	no	no	
Heptachlor epoxide	no	no	
Methoxychlor	no	no	
Aroclor 1242	YES	no	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1248	YES	no	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1254	YES	YES	Acid Lagoon area, Max > current screening value
Aroclor 1260	YES	no	Already a COPC, Main Plant
Semivolatiles			
1,2,4-Trichlorobenzene	no	no	
Phenol	no	no	
Pentachlorophenol	no	no	
Carbazole	no	no	
Bis(2-ethylhexyl)phthalate	no	no	
Di-n-butylphthalate	no	no	
Di-n-octylphthalate	no	no	
Dibenzofuran	no	no	
2-Methylnaphthalene	YES	no	Max < current screening value
Acenaphthene	no	no	
Acenaphthylene	no	no	
Anthracene	no	no	
Benzo[a]anthracene	no	no	
Benzo[a]pyrene	no	no	
Benzo[b]fluoranthene	no	no	
Benzo[b&k]fluoranthene	no	no	
Benzo[g,h,i]perylene	no	no	
Benzo[k]fluoranthene	no	no	
Chrysene	no	no	
Dibenz[a,h]anthracene	no	no	
Fluoranthene	no	no	
Fluorene	no	no	
Indeno[1,2,3-cd]pyrene	no	no	
Naphthalene	YES	no	Max < current screening value
Phenanthrene	no	no	
Pyrene	no	no	
Volatiles			
1,1,2-Trichloroethane	no	no	
1,1-Dichloroethane	no	no	
1,1-Dichloroethene	no	no	
1,2-Dichloroethane	no	no	
1,2-Dichloroethene (total)	no	no	
2-Butanone	no	no	
2- Hexanone	YES	no	Max < current screening value
4-Methyl-2-pentanone	no	no	
Acetone	no	no	
Benzene	YES	no	Max < current screening value
Carbon disulfide	no	no	
Chlorobenzene	YES	no	Max < current screening value

Chloroethane	YES	no	Max < current screening value
Chloroform	no	no	
cis-1,3-Dichloropropene	no	no	
Ethylbenzene	no	no	
m,p-Xylenes	no	no	
Methylene chloride	no	no	
o-Xylene	no	no	
Styrene	No	no	
Tetrachloroethene	No	no	
Toluene	No	no	
Xylenes (total)	No	no	
Trichloroethene	YES	YES	Main Plant, Acid Lagoon area, Max > current screening value
Vinyl chloride	No	no	

Screening value = 0.1 x RBC for Residential Soil from EPA Region III (EPA 2002).

ATTACHMENT 5 - Report of Community Interviews

Persons interviewed:
__6_ - Private individuals
__1 - City/ County elected officials
__8 - City/County agency, department or organization representatives
__1 - Nearby business representatives
__3 - Environmental group representatives
__1 - Local Labor representatives

_15 Homeowners
__1 Tenants
__4 Not residents of the Kokomo area

Number in household ranged from one (1) to four (4) persons.
Time of residence ranged from zero (0) to sixty-three (63) years, with an average of twenty-six (26) years.

How do you feel about the rate of the investigation and cleanup?
_9_ Good or okay
_7_ Slow
_1_ Other (See "Summary of Other Issues and Comments")

What do you think might be the reason(s) for the time involved?
11 - Funds
_4 - Bureaucracy
_8 - Logistics
_1 - Other (See last question: "Do you have any other comments or concerns?")

Have information updates been frequent enough?
15 - Yes
_2_ - No

How would you suggest that we improve communication?
Suggestions included increased mailings, meetings, email reports, and media use; and making the IDEM web site more user-friendly.

Do you feel that news media is reliable?
_8_- Yes
_7_- No
_3_- Sometimes

What do you think is the best way to reach you with factual information?
10 - Fact Sheets /mailings
_3 - Email
_1 - Radio

_3_ - Newspaper
_1_ - Meetings
_1_ - Individual interviews

Please choose your top 4 sources of information, and rank them 1-4.

Table 2 - Community Interview Information Source Results

Information Source*	0	1	2	3	4	Total
*Fact sheets (from IDEM or EPA)****		4	1	2	10	17
*Public meetings****		2	9	5		16
*Newspaper****		8	2	3	1	14
*City/County Officials****		1	4	3		8
IDEM internet web site			1	3	3	7
Radio		1		2	3	6
Other **			4	1	1	6
Television		1	1			2
Neighborhood associations				1		1
Information repository (library)					1	1
Labor organization					1	1
Community/church organizations			1			1
City or County internet web sites	0					0
Civic/community meetings	0					0
Other elected representatives	0					0

* Some respondents selected less than four information sources.
** Responses included former employees, IDEM project manager, onsite individuals, and Wildcat Guardians.
*** Top four selections.

Previously, community members were concerned about impacts to Kokomo and Wildcat Creeks and area groundwater from Continental Steel and other sources. Do you feel these are still potential problems?
16 - Yes
_2_ - No
_2_ - Unsure

How would you rate your understanding of the Superfund process? (1 = very good, 2 = medium, 3 = poor)
_2_ - Very good
13 - Medium
_5_ - Poor

Do you think that community understanding and concern about the site is strong enough to impact the quality of the investigation and cleanup?
_9_ - Yes
_7_ - No

_1 - Some

Are you concerned about the cost of the cleanup to taxpayers? Do you have any suggestions?
15 - Yes
_3 - No
Suggestions included: spend more money on enforcement/prevention; science is too detailed; some costs are exotic; scrutinize actions and costs; and Superfund funding should be reauthorized.

Do you feel that the site poses risks now to members of the community?
_7 - Yes
_8 - No. (Most of these noted that removal of the buildings eliminated the risks.)
_3 - Unsure

Who do you think should own/control the site?
_9 - Government
_1 - Private developer
_3 - Either private or government
_2 - Other (See Full Statement of Phil Kauble below)

Have your property values been affected by the site or by the cleanup so far?
_1 - Yes
_8 - No
_2 - Not applicable, person does not live in the Kokomo area.
_1 - Other (Stated that property value increased when the steel mill closed.)

Did your property undergo soil removal and restoration?
_1 - Yes
15 - No

What would you like to see the site used for in the future?
_6 - Park
_6 - Mixed recreational and industrial/commercial uses
_2 - Industrial
_1 - Compost operation
_3 - Commercial
_2 - Stormwater storage
_1 - Environmental education center

Are you aware of or participating in the re-use study that the City is working on?
_2 - Yes
_9 - No
_3 - Aware but not participating
_3 - Aware and participating

If you have a question or problem with the site, do you know whom to contact?
19 - Yes
3 - No

Do you have any other comments or concerns?

Concern	Response
Concerned that background is affected by other sources of contamination.	Background is affected by other sources, however, CERCLA will only address contamination attributable to the site being addressed.
Concerned about whether the walls in the center of the site and at the east perimeter of the site will remain.	The center wall will be removed as part of the fianl remedial action. The east wall was left as requested by residents at the time. It may be removed by a future property owner.
Concerned about other PCB-contaminated areas (Kitty Run Drain, "The Farm" and another former quarry site near the intersection of Washington Street and Park Avenue).	These sites have been referred to IDEM and EPA for further investigation.
Concerned about the length of time for the creek to recover from cleanup work, and effects on trees and the flow of water in the stream. Concerned about the details of the plan to reroute water through pipes during the creek dredging. Concerned about the condition of the creeks after the cleanup, and the decision process with regard to PCB cleanup goals. The habitat of the creek is important to support the ecosystem.	It may take the creeks 1-2 years to recover from cleanup work, however, the cleanup will provide a much healthier environment for biota. We have shared restoration plans with the community and they were favorably received. Specific design plans will address concerns about effects on trees and water flow, and provide details on rerouting of water. The planned ROD Amendment will provide information regarding the decision process with regard to cleanup goals.
Concerned about possible future monitoring of the CAMU.	IDEM will be responsible for future monitoring.
Local government should not sustain any liability.	Liability protection from past environmental damage is provided to local government by State law. EPA and IDEM are working with local government to resolve Superfund liability issues.
Concerned about the status and time frame for cleanup of the stone quarry, and whether wells will need to be placed on their property. Contaminated water migrates to the basement of the neighboring buildings. Wants list of groundwater contaminants. Concerned about control of wildlife during quarry work.	The remedial action may be completed by 2009 if adequate funds are available. No more wells are expected to be needed on the property in question. A list of groundwater contaminants was provided. Wildlife may be controlled using an approach similar to that used during the Main Plant building demolition.
Want soil removal done by local organized labor, and a Project Labor Agreement for future work on this project.	Such an agreement may be used to the extent allowed by the law. Every effort will be made to work with local labor organizations.
Concerned about sediment drainage during the cleanup of the creeks and long term use of the site.	An Erosion Control Plan will be provided that addresses such sediment drainage.
Concerned about safety of yard that is near the	Some additional soil sampling for PAHs is

site but was not tested.	recommended by this report. The extent of lead contamination was identified and address during the Residential Soil Removal Action.
IDEM and onsite personnel were helpful in completion of new soccer field project.	Thank you for your comment.
Former employees lost jobs and pensions when the plant closed, therefore, a private individual should not profit from the land. Former employees should be given free and clear title to the property. (See full statement of Phil Kauble below.)	This issue should be addressed by local planning concerns.
The cleanup is a farce, the system is irresponsible, IDEM is not doing a responsible job of cleanup and very little has been done to control the problem.	IDEM and EPA have performed extensive work and removed great volumes of contaminants from the site, and will continue efforts to complete the cleanup.
Concerned about what was in the air, water and ground of the immediate neighborhood before the closure.	IDEM and EPA have investigated the site and information regarding contaminants currently in air, water and ground is available at the Public Information Repository. Additional information collection during the plant's operation is available at the IDEM Central File Room, 12th Floor, Indiana Government Center North, Indianapolis, IN. The file room is open to the public from 8:15 a.m. until 4:45 p.m., Monday through Friday.
On-site containment and construction of a CAMU are not protective in the long term, off-site disposal should be considered.	Off-site disposal was considered during the Feasibility Study but was not chosen because on-site disposal provided equivalent protection at a significantly lower cost. As requested, an updated estimated for off-site disposal was developed. Off-site disposal would cost an additional $10 - 12 million.

FULL STATEMENT OF PHIL KAUBLE (This written statement was submitted during the interview.)
When addressing the future use, control and ownership of the Continental Steel Superfund site, the voice of the former workers should be given high priority for the following reasons.

Because Penn-Dixie Industries, Inc., intended to loot the workers' pension fund and abandon Continental, the workers went on strike to resist the attack at the bargaining table. Being successful, the workers gained ironclad contract language guarantying the funding and ethical administration of their retirement program. Then, in 1974, Congress enacted the Employee Retirement Income Security Act (ERISA) to insure, amongst other things, that pension plan administrators operate a pension plan in accordance to the documents and instruments governing the plan they administer, without dual loyalties and for the sole purpose and benefit of the plan participants and beneficiaries in the highest standard of integrity, ethics and prudence under the strict rules governing fiduciaries. The Continental plan carried with it the full force and effect of ERISA after 1974.

Penn-Dixie filed for Chapter 11 bankruptcy in 1980. Because of the woefully under-funded position of all Penn-Dixie pension plans, including continental's, the pension benefit guaranty corporation, the federal pension watchdog, was a key player in the case and a major beneficiary of the 1980 settlement. Subsequently, PBGC took millions from the pot that was needed for continental's survival. Moreover, Continental became obligated to pay PBGC millions more between 1980 and its closing in 1986. Millions for pension liabilities on plans that were supposed to be fully funded by contract and law after 1971 and 1974, respectively. In all due respect, the Pension Benefit Guaranty Corporation became the same parasitic bloodsucker on Continental's financial position and ability to survive as Penn-Dixie was before the 1980 bankruptcy. Obviously, Continental needed every dollar it could get its hand on to survive, and PBGC taking everything it could from Continental to satisfy debt that should not have been in the first place. Why Continental was allowed to violate the contract and law under-funding the pension plan to be in a position of owing PBGC anything remains a mystery. Obviously, someone in government did not do their job and allowed Continental to slip through the crack.

In 1982, and again in 1983, Continental asked the workers for concessions. The workers first refused to even listen to the demand in both cases. Before giving Continental anything the workers demanded to know the status of the pension plan. And, of course, they were given all kinds of assurances that they had the "Cadillac" of pension plans and that it was fully funded. However, as the entire world now knows, this was nothing but bald faced lies.

Only after being falsely assured and re-assured numerous times that their pension plan was in absolute perfect order did they agree to give Continental concessions, which amounted to over $30 million by the time Continental closed in 1986. And, because of their cooperation, Continental gave their union a seat on its board of directors. And from this position, the union participated in decisions on continental's day to day business affairs and the administration of the pension plan without the workers' knowledge or consent.

In late September or early October 1985, Continental stopped paying the workers' insurance claims. However, the union did absolutely nothing at the time to remedy this breach of contract and violation of labor law.

On November 25, 1985, Continental filed Chapter 11, bankruptcy. And, although the bankruptcy rules provide the right to be heard, but not to appeal, to labor unions, the union filed a motion to intervene as a creditor. However, the union was not a creditor and never filed a proof of claim at any time to support its absurd motion.

The Chapter 11 was converted to a Chapter 7 on February 25, 1986. And at no time did the union move to intervene or bring forward its motion to participate in the Chapter 7 case as a creditor or anything else. However, the record is replete with pleadings asserting the union was the official agent of the now former employees. In sum, the union's Chapter 11 motion as a creditor, even if valid, was not as a labor union giving rise to any representation of union employees or other creditors. How the union used this motion as a creditor to purport to represent other creditors is another complete and utter mystery.

The United States Supreme Court ruled in 1971 that labor unions do not represent former employees and retirees. In other words, **the union had no business whatsoever in the Chapter 7 case of Continental Steel, but our government did absolutely nothing to stop this fiasco.**

The Pension Benefit Guaranty Corporation and the EPA/IDEM filed motions to intervene and were beneficiaries of the 1986 bankruptcy settlement to the tune of $5 million. In sum, PBGC, EPA/IDEM claims competed against the former workers in the final divvy of Continental's assets. And, although legal, the issue of ethics and fairness are certainly in question in this instance. After all, PBGC had already taken a huge share of gold from the pot between 1980 and 1986, which helped insure Continental's demise. It did absolutely nothing between 1974 and 1986 to insure that Continental was operating the pension plan in compliance with the documents and instruments governing the plan as required by law that PBGC was duty bound to enforce at all times after the enactment of ERISA in 1974. In sum, the claim PBGC enforced in continental's bankruptcy was due to PBGC's negligence in the first place. PBGC was only worried about getting as much money as it could from Continental and didn't give a hoot about doing anything to help the workers. PBGC never once included the workers in anything.

And, Continental was in violation of environmental standards long before 1986, but had only $150,000 in the closure trust fund for clean up. EPA/IDEM had plenty of time and notice of problems before Continental closed to raise the bar on Continental's obligation, but did nothing. If PBGC was taking as much money as it could from Continental, then why didn't EPA/IDEM do the same thing?